

Flame Safeguard Catalog 2004



Featuring:

**7800 SERIES
Burner Control
Systems**

**ControlLinks™
Fuel Air
Control System**

**Flame Safeguard
Controls**

**Flame Safeguard
Systems**

TOTAL BURNER AND BOILER CONTROL

Buying Rebuilts? Proceed with CAUTION

We would like to address a subject that is a concern to all of us—safety—specifically burner and boiler safety controls.

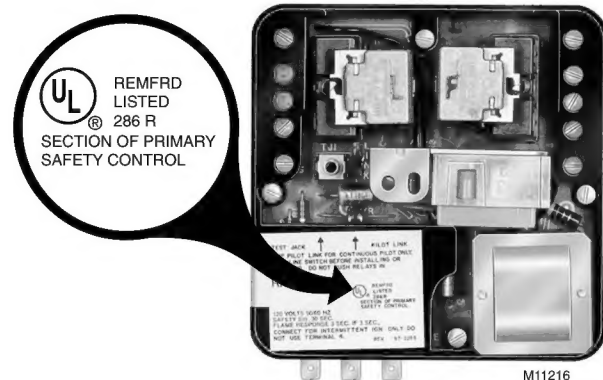
As an industry leader in the manufacture of Flame Safeguard controls, Honeywell feels obligated to inform you of the difference between Honeywell controls and controls repaired by an independent rebuilder.

There are a number of standards and codes for burners and boilers and the controls for burner and boiler equipment. Among the most familiar are those established by Underwriters Laboratories Inc. (U.L.). The U.L. standards are often the basis used for local, city, state, insurance, and other codes. Chances are that when a burner or boiler was originally purchased, it met the U.L. standard in effect at the time.

When controls fail, they are replaced with new controls or repaired controls. There are potential safety concerns regarding controls repaired by an independent rebuilder.

1. The controls purchased from independent rebuilders may utilize parts from old controls or other parts that may not meet approved specifications required for safety.
2. Honeywell remanufactured controls were upgraded to the latest code revisions and engineering specifications. Independently rebuilt controls typically are not.
3. Honeywell new and remanufactured Flame Safeguard controls are U.L. Listed or Component Recognized. Independently rebuilt controls are not. Do not be misled by rebuilders who do not remove the original U.L. or other listing identification when they "repair" the control.
4. Since rebuilt controls are not approved by a nationally recognized testing agency, they do not meet CSD-1, the standard adopted by many states and municipalities. Therefore, equipment with rebuilt controls does not meet code in these locations. This could leave you without insurance should the rebuilt control fail and cause damage.
5. When parts meeting Honeywell specifications and quality standards became difficult to obtain, we discontinued the remanufacture of Flame Safeguard controls. For replacement purposes, Honeywell provides a new control, often through a replacement exchange program. Independent Rebuilders, however, frequently continue to repair these controls.

Although we no longer remanufacture Flame Safeguard controls, there are many Honeywell remanufactured controls still operating safely and reliably. How do you differentiate genuine Honeywell remanufactured controls from independently rebuilt controls? How do you recognize an independently rebuilt control? Typically, it has all of the approval body designators removed. A rebuilder will often put his own label on the device, but this label may be removed later; therefore, a rebuilt control can be difficult to identify. The only way to be sure you have a Honeywell remanufactured control is if it is stamped "REMFRD" or "REMFRD Listed" near the U.L. or Component Recognized symbol, and if the letter "R" follows the date code (e.g., 8850R) or the serial number (e.g., S/N8906Q018R).



Honeywell Flame Safeguard controls are specifically designed to supervise the safe operation of a boiler. Therefore, safety is involved. If you have any doubts that you have a genuine, Honeywell device, please call the nearest Honeywell Home and Building Control Representative or Authorized Honeywell Flame Safeguard Distributor for verification and to discuss your options.

If you have any other questions about rebuilt controls, or would like to receive literature, please call:

1-800-345-6770 extension 760.

The products in this catalog are protected by U.S. and foreign patents. Illustrations and product descriptions published in this catalog are not binding in detail. To determine the suitability of a product for a specific application, the customer should consult the product data sheets provided with the product, or contact Honeywell directly. In keeping with its policy of continued improvement, Honeywell reserves the right to change or modify design or specifications of products without notice or obligation.

Flame Safeguard Products

This catalog features Honeywell Commercial Combustion products

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Product Selection Matrix for CE Sequence Primary/Programmer Relay Modules:

For 230 Vac nominal applications—

| Fuel | Burner Type | Relay Module Type |
|-----------------------|--------------------------------|-------------------|
| Single | Atmospheric | EC7810 |
| Single | Atmospheric with fan | EC7820 |
| Combination or single | On/Off Controlled Power Burner | EC7830 |
| Combination or single | Full Modulation Power Burner | EC7850 |

For 120 Vac nominal applications—

| Fuel | Burner Type | Relay Module Type |
|-----------------------|--------------------------------|-------------------|
| Combination or single | On/Off Controlled Power Burner | RM7830 |
| Combination or single | Full Modulation Power Burner | RM7850 |

Use the following pages to select the following *required* devices:

Relay Module, 1 per burner
Subbase, 1 per relay module
Purge Timer Card, 1 per relay module
Flame Amplifier, 1 per relay module

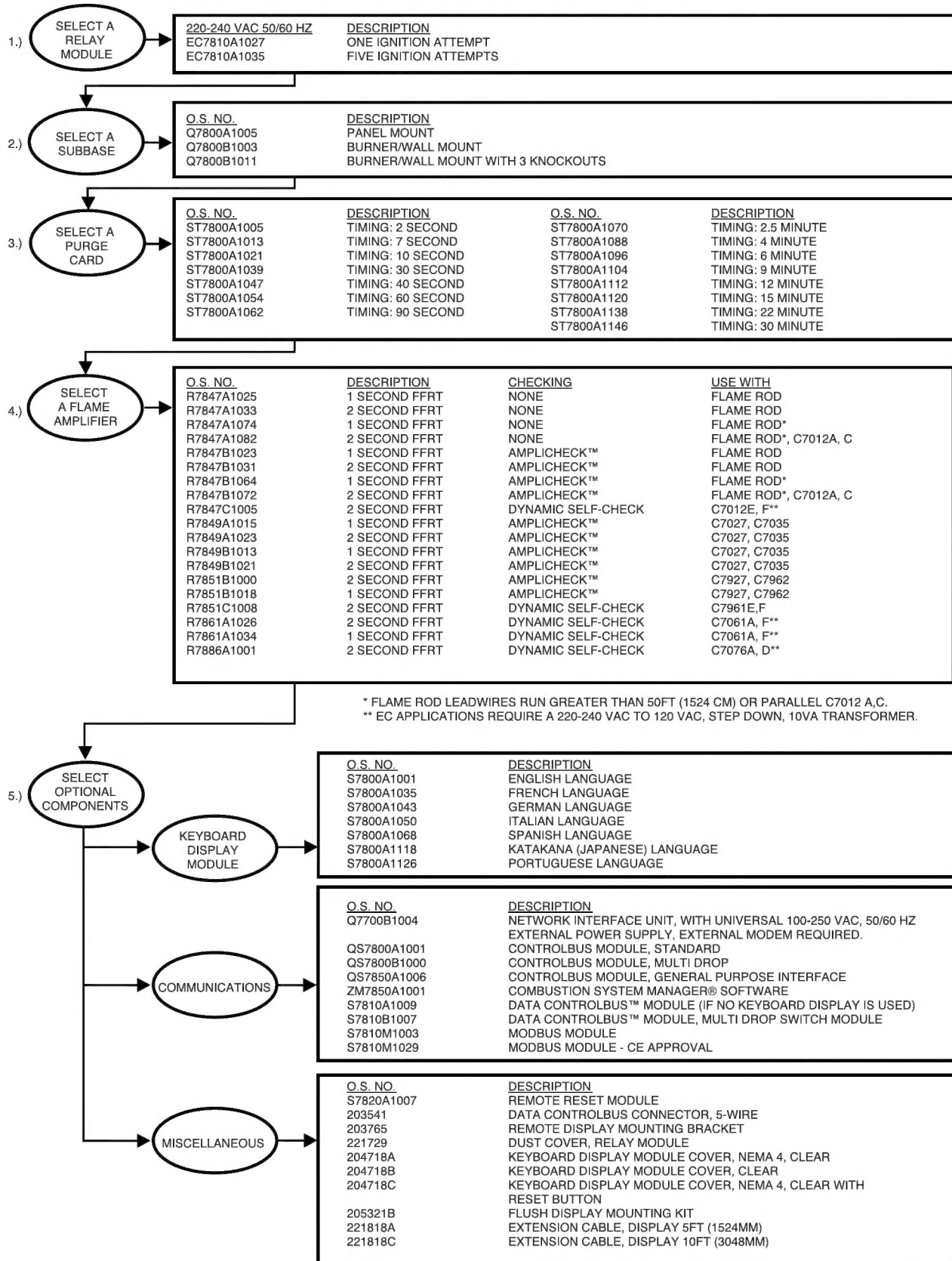
Some products are available only through Authorized Flame Safeguard
Wholesalers and/or Distributors.

Use the following pages to select the following *optional* devices:

Keyboard Display module, up to 1 mounted to relay module, remote as
desired
Communications, network and ControlBus™ modules to service
selected relays
Miscellaneous, as required to complete installation

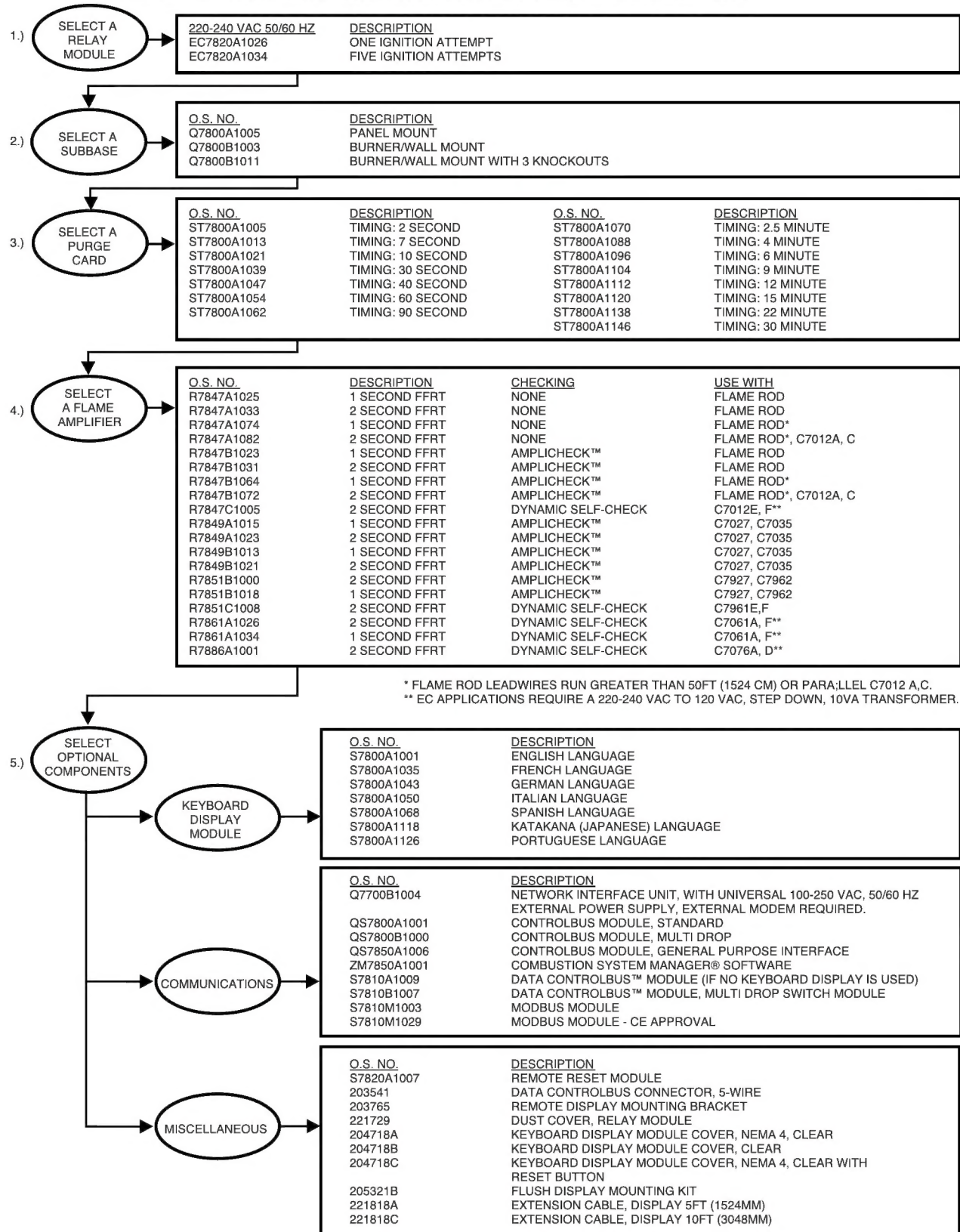
Product Selection Matrix

PRODUCT SELECTION MATRIX FOR EC7810 PROGRAMMER RELAY MODULES:



M15515B

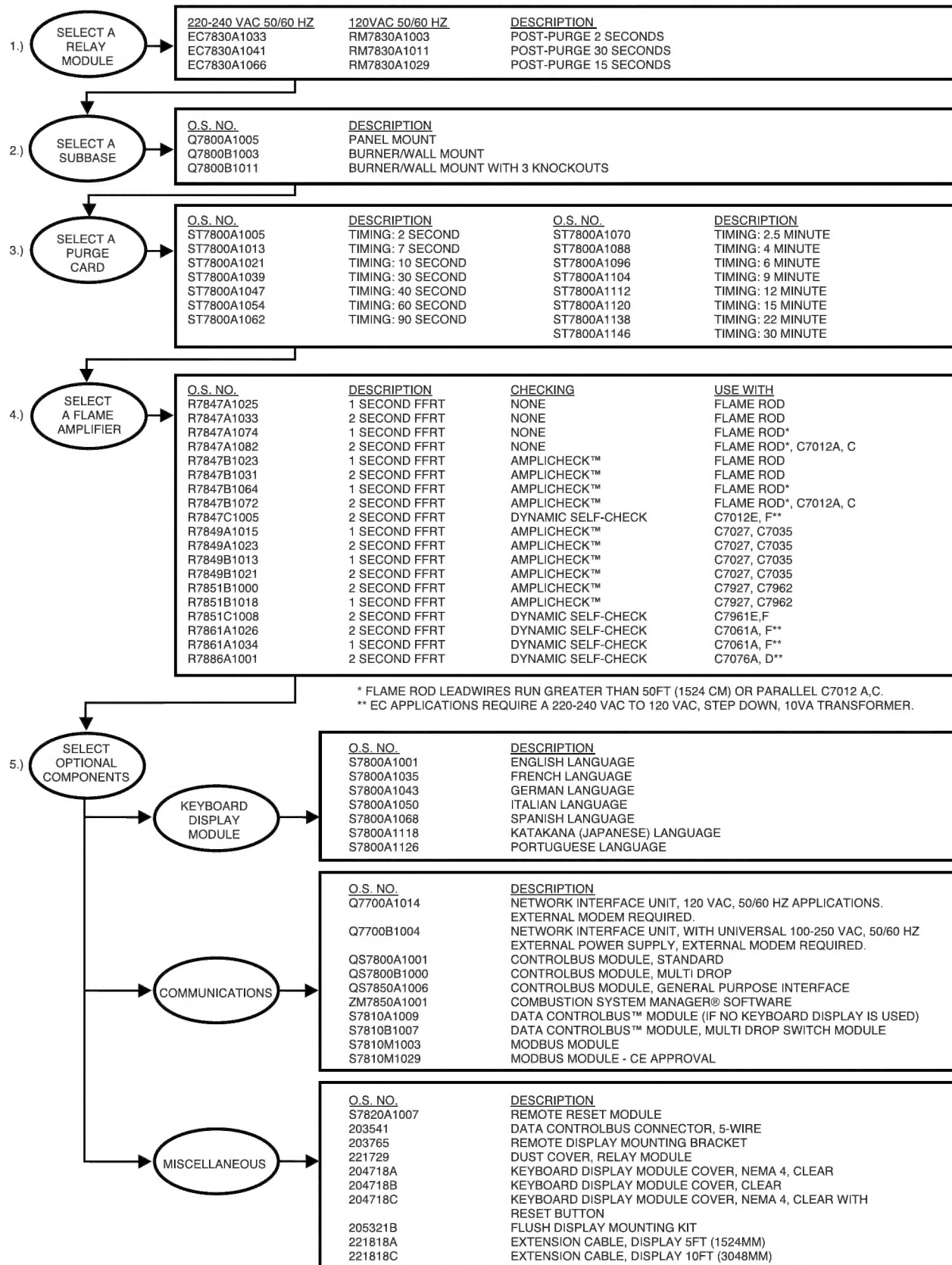
PRODUCT SELECTION MATRIX FOR EC7820 PROGRAMMER RELAY MODULES:



M15516B

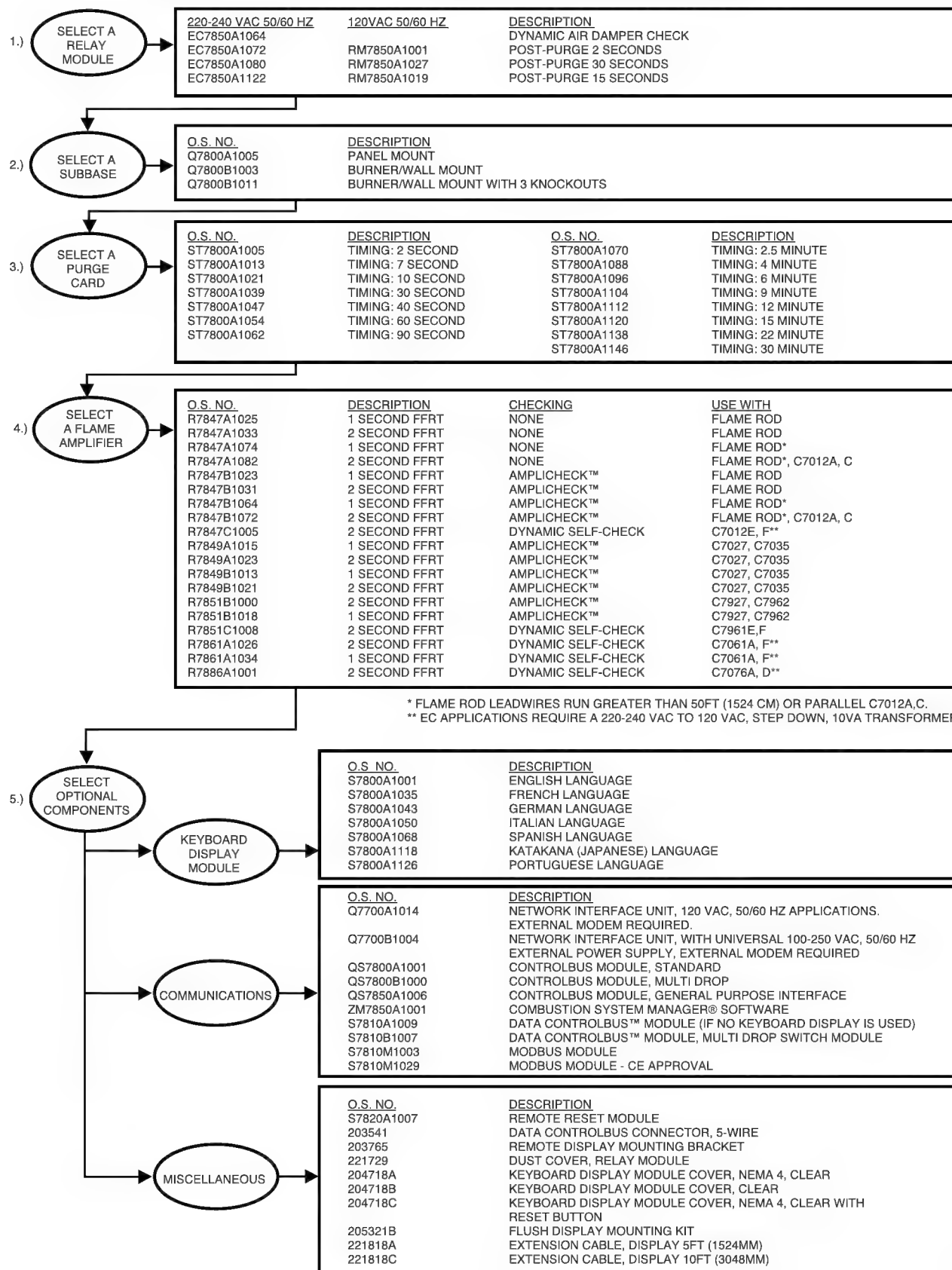
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M15517B

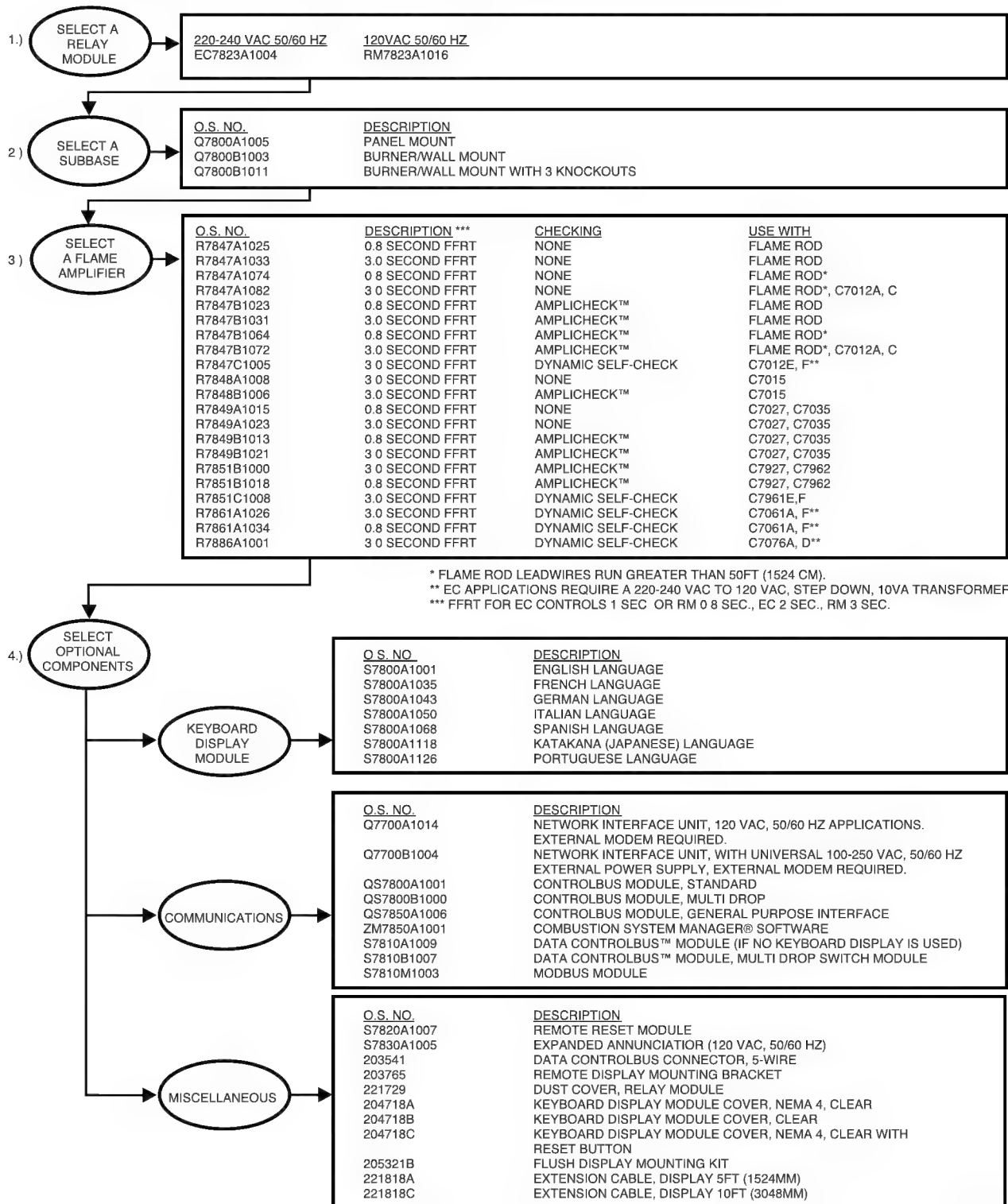
PRODUCT SELECTION MATRIX FOR EC/RM7850 PROGRAMMER RELAY MODULES:



M15519B

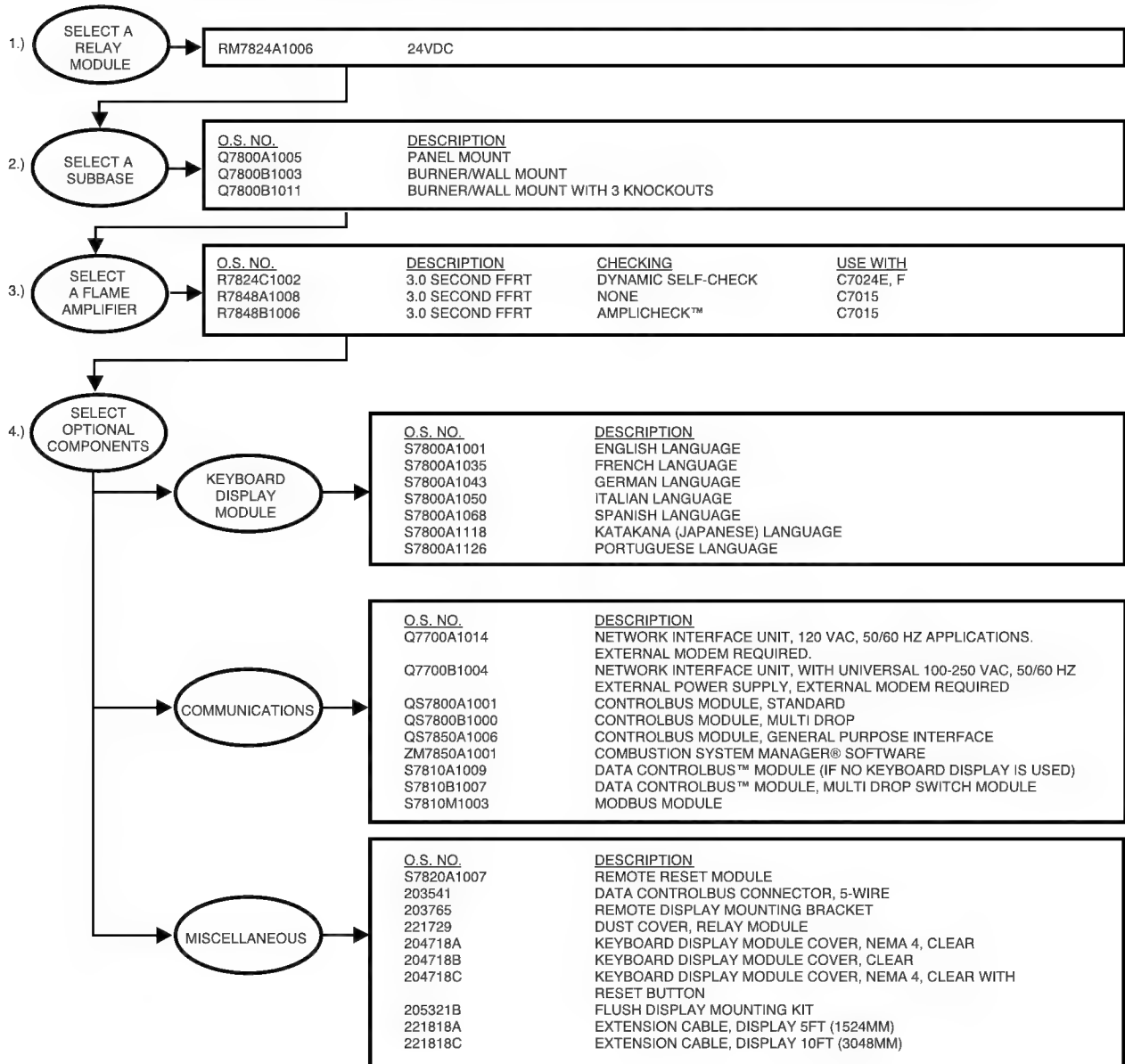
Product Selection Matrix

PRODUCT SELECTION MATRIX FOR EC/RM7823 FLAME SWITCH RELAY MODULES:



M15520B

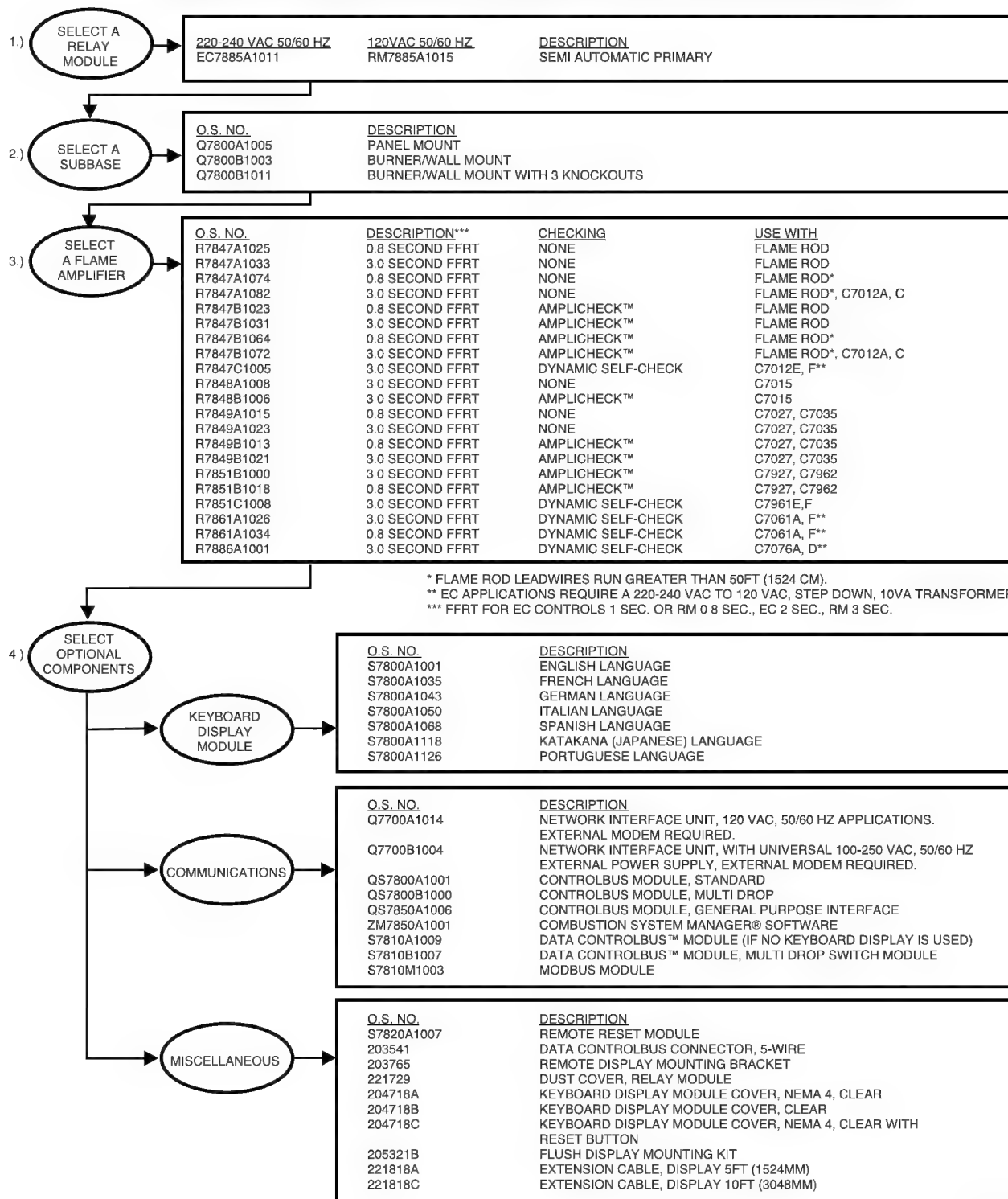
PRODUCT SELECTION MATRIX FOR RM7824A 24VDC PRIMARY CONTROL RELAY MODULES:



M15521A

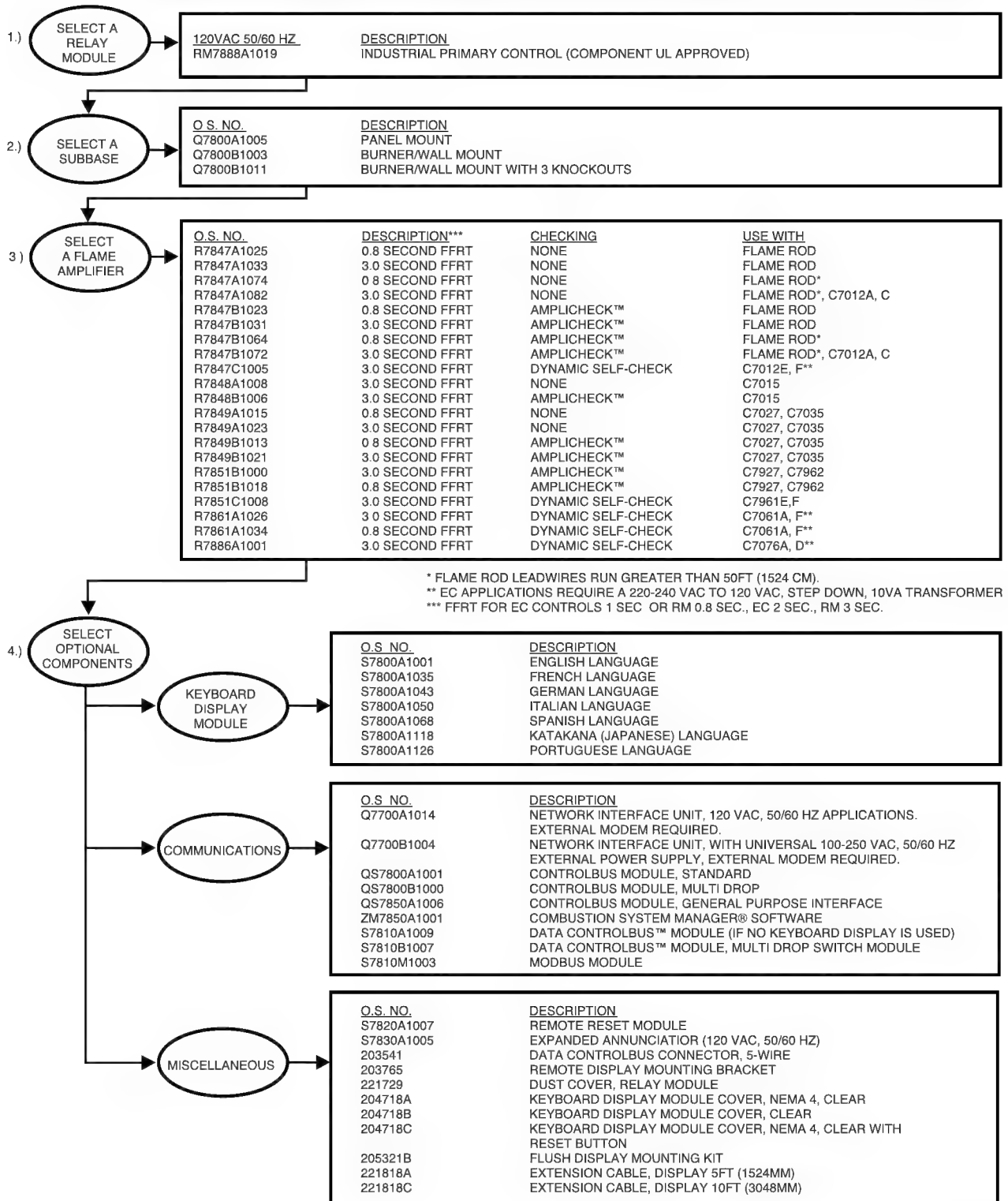
Product Selection Matrix

PRODUCT SELECTION MATRIX FOR EC/RM7885 MANUAL START PRIMARY RELAY MODULES:



M15522B

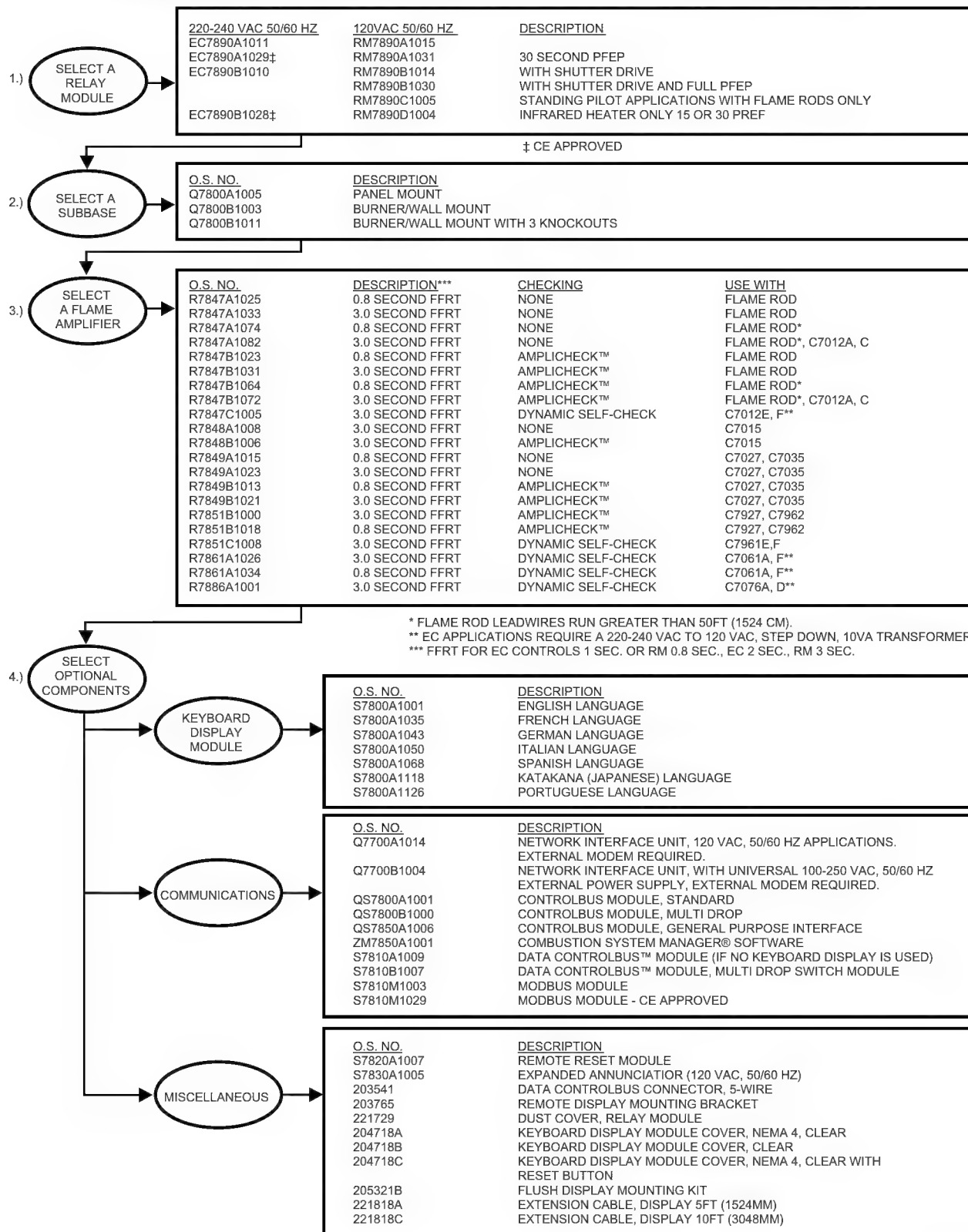
PRODUCT SELECTION MATRIX FOR RM7888A SPECIAL FUNCTION PRIMARY CONTROL RELAY MODULES:



M15523B

Product Selection Matrix

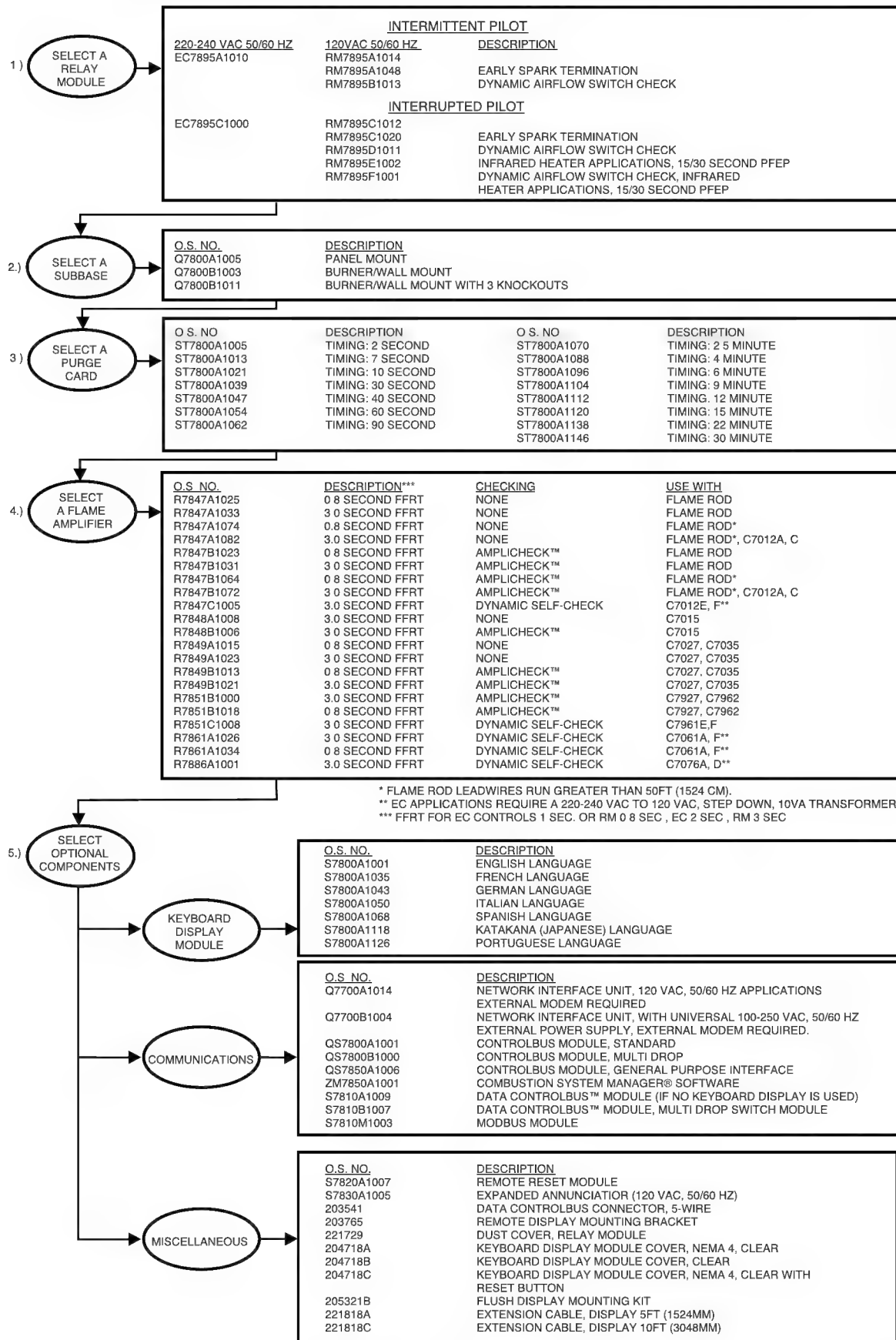
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M15524B

Product Selection Matrix

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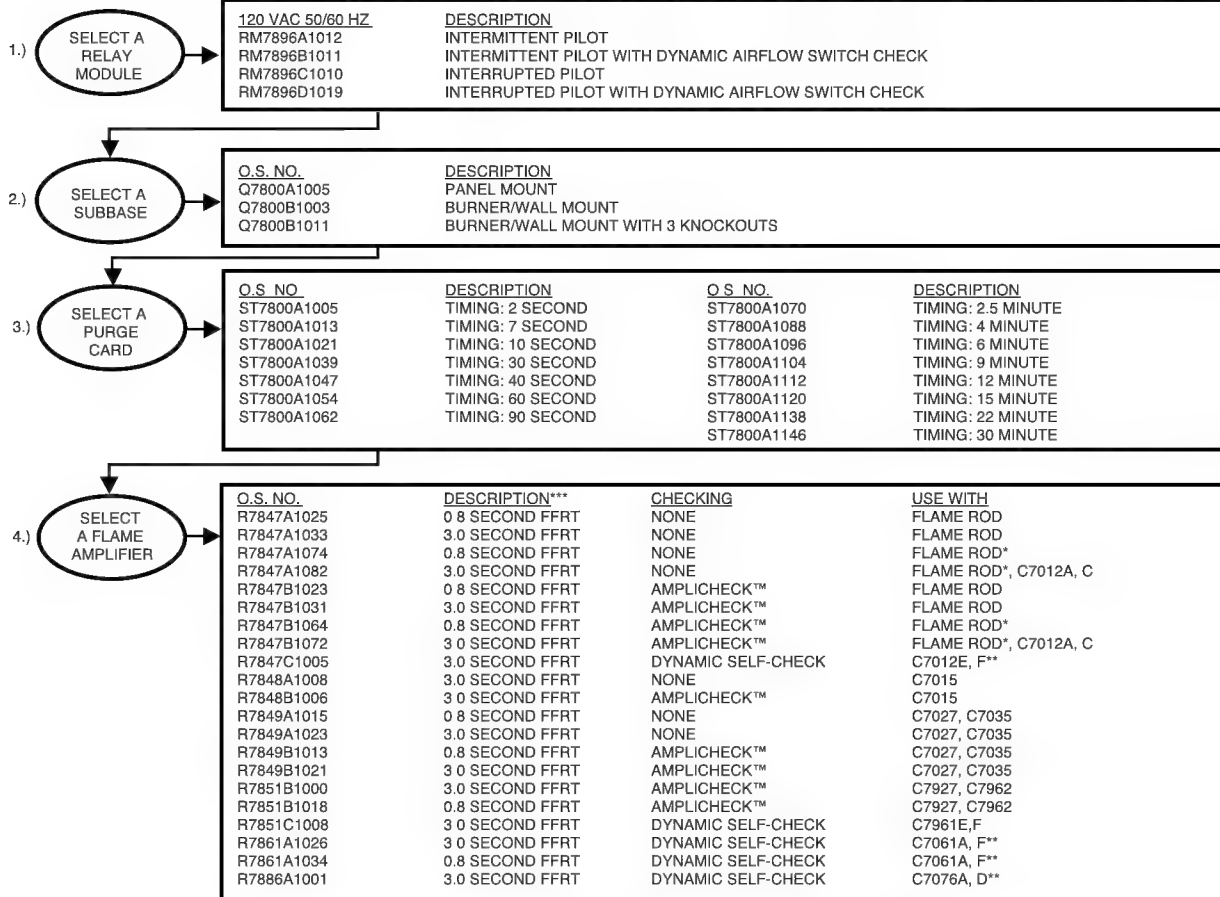


M15525B

Products are available through authorized Honeywell distributors

Product Selection Matrix

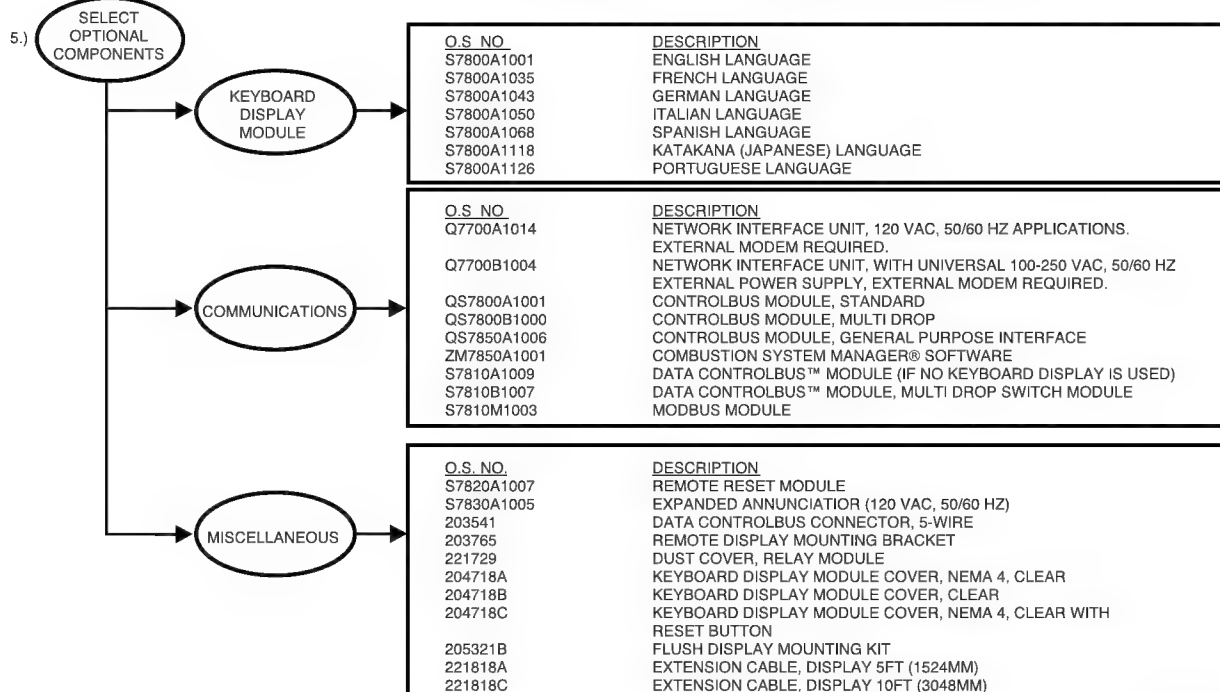
PRODUCT SELECTION MATRIX FOR RM7896 ON/OFF WITH PRE- AND POST-PURGE PRIMARY RELAY MODULES:



* FLAME ROD LEADWIRES RUN GREATER THAN 50FT (1524 CM).

** EC APPLICATIONS REQUIRE A 220-240 VAC TO 120 VAC, STEP DOWN, 10VA TRANSFORMER.

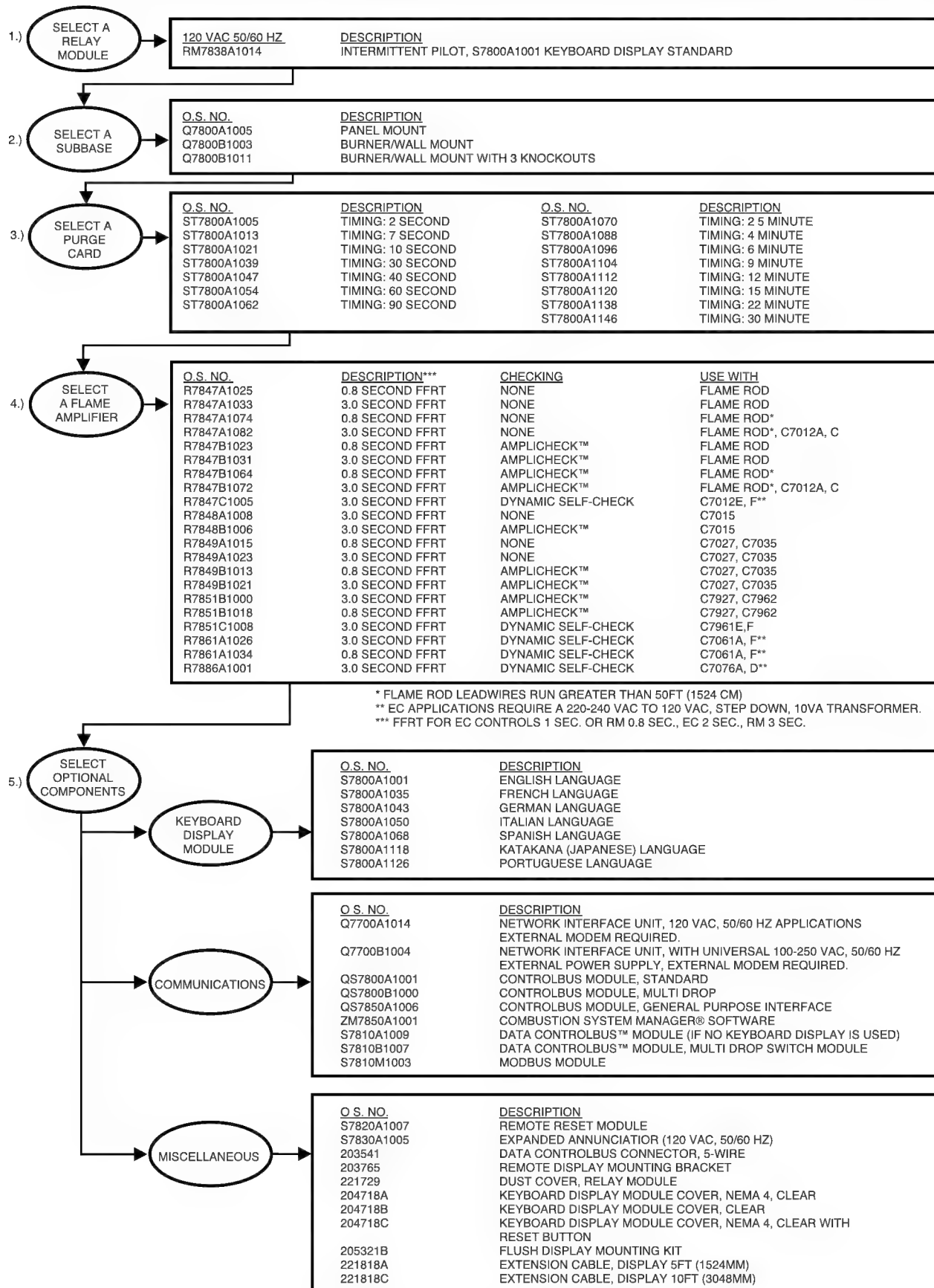
*** FFRT FOR EC CONTROLS 1 SEC. OR RM 0.8 SEC., EC 2 SEC., RM 3 SEC.



M15526B

Product Selection Matrix

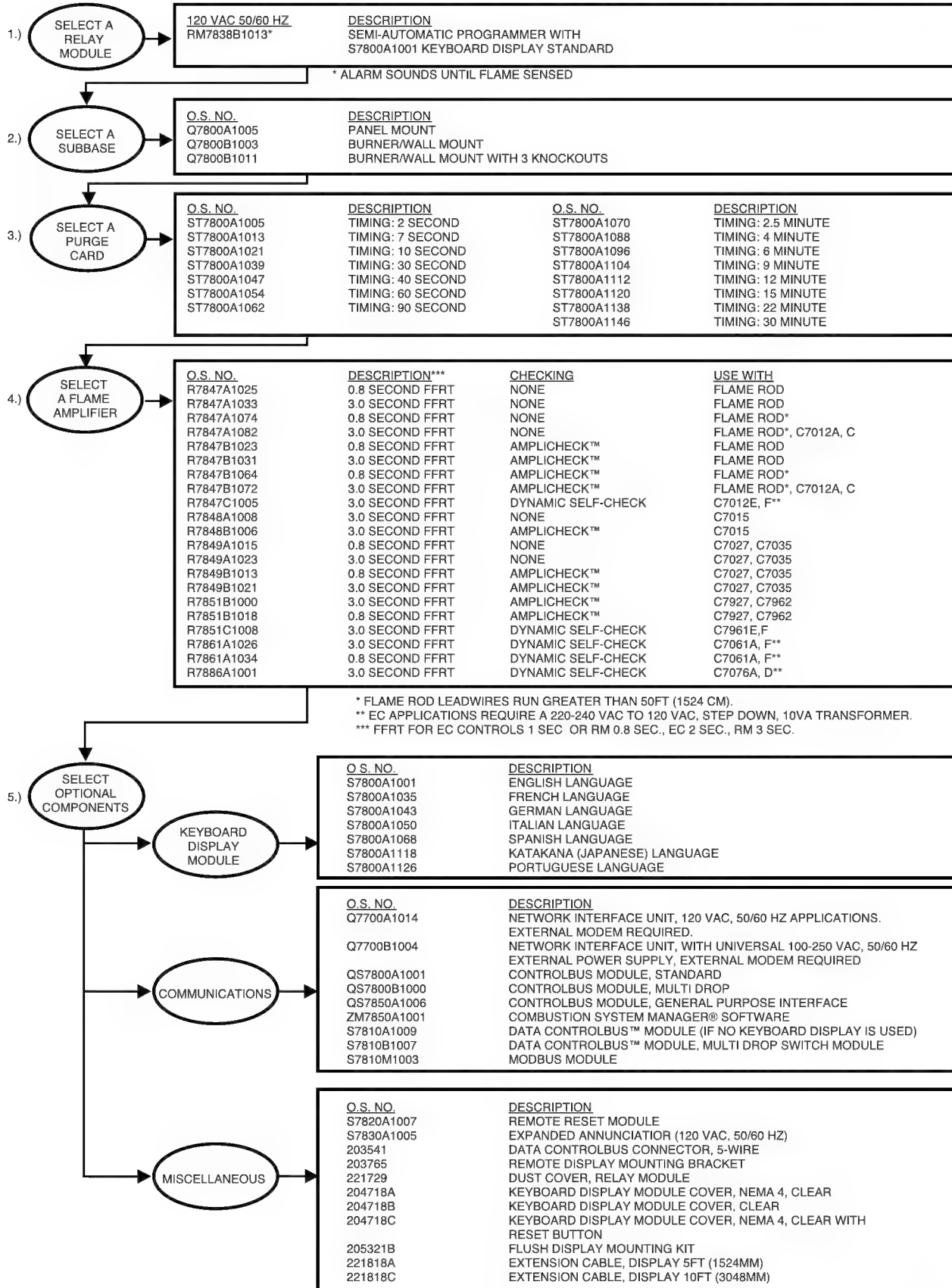
PRODUCT SELECTION MATRIX FOR RM7838A MANUAL START WITH PURGE INDUSTRIAL PRIMARY RELAY MODULE:



M15527B

Product Selection Matrix

PRODUCT SELECTION MATRIX FOR RM7838B MANUAL START INDUSTRIAL PROGRAMMER RELAY MODULE:



M15528B

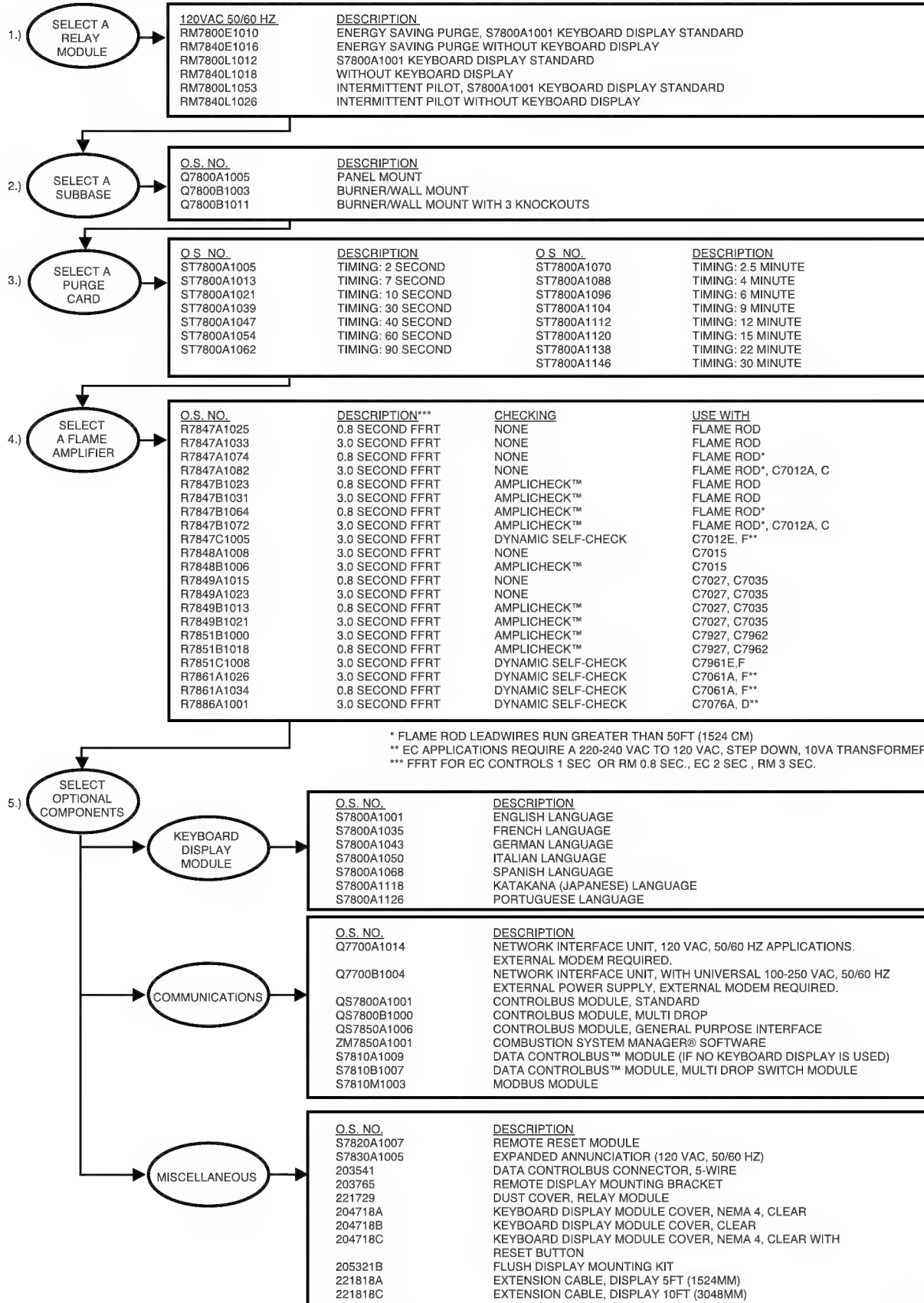
PRODUCT SELECTION MATRIX FOR UL/CSA RM78XXG,M PROGRAMMER RELAY MODULE:



Products are available through authorized Honeywell distributors

Product Selection Matrix

PRODUCT SELECTION MATRIX FOR FM/IRI RM78XXE, L PROGRAMMER RELAY MODULE:



M155308

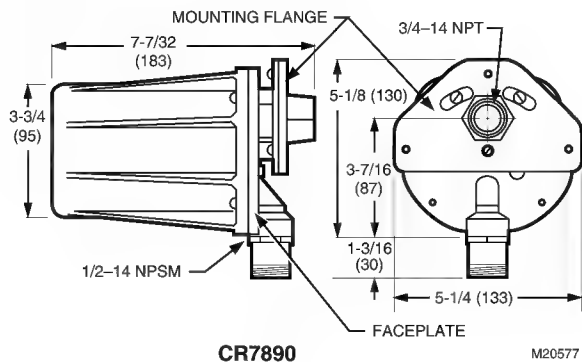
7800 SERIES Relay Modules

CR7890 Integrated Burner Control



- The CR7890B Integrated Burner Control consists of a self contained relay module, amplifier and a shutter type solid state Ultraviolet Detector for sensing the ultraviolet radiation generated by the combustion of gas, oil, or other fuels.
- Oscillating shutter interrupts ultraviolet radiation reaching the UV sensor to provide the UV sensor checking function. Amplifier circuitry components are checked from the microprocessor in the CR7890B Control.
 - Device can be mounted horizontally, vertically or at any other angle. The device has faceplate alignment and integral locating reference points to assure proper shutter mechanism operation.
 - Quartz viewing window is field replaceable.
 - CR7890B1019 uses Brad Harrison® 3R9006A20A120 connector.
 - A swivel mount is available to facilitate flame sighting.
 - -40°F (-40°C) rated ultraviolet sensing tube.
 - High pressure 50 psi (345 kPa) quartz viewing window, magnifying lens and antivibration mount are available as accessories.
 - Housing meets NEMA 4 enclosure standards. (NEMA 1 when access cover is used.)
 - Protective heat block built into mounting flange.
 - Power LED blinks a fault code when device is in ALARM state.
 - Optional Keyboard Display Module (KDM)

Dimension Diagrams



Dimensions, Approximate: 5 1/4 in. wide, 5 1/8 in. high, 7 7/32 in. deep (133 mm wide, 130 mm high, 183 mm deep)
Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)
Vibration: 1.0 G environment
Weight (lb): 3.78 lb (1.71 kg)
Approvals:
Canadian Standards Association: Certified
Control Safety Devices: Acceptable: CSD-1.
Factory Mutual: Approved: Report No. J.I.1V9AO.AF.
FCC Emissions: FCC Part 15, Class B, Emissions.
Industrial Risk Insurers: IRI Acceptable.
Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Accessories:
32005580-001 Cable for connecting Keyboard Display Module (KDM) to CR7890
32006648-001 NEMA I Cover for CR7890B
32007181-001 Wiring Harness with 9-pin Brad Harrison/E to CR7890

| Product Number | Electrical Ratings, Power Supply (Vac) | Electrical Ratings, Power Supply (Hz) | Flame Establishing Period | | Pilot Type | Description |
|----------------|--|---------------------------------------|---------------------------|--------|--------------|---|
| | | | Main | Pilot | | |
| CR7890B1019 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec | 10 sec | Intermittent | Integrated Burner Control w/Brad Harrison connector |

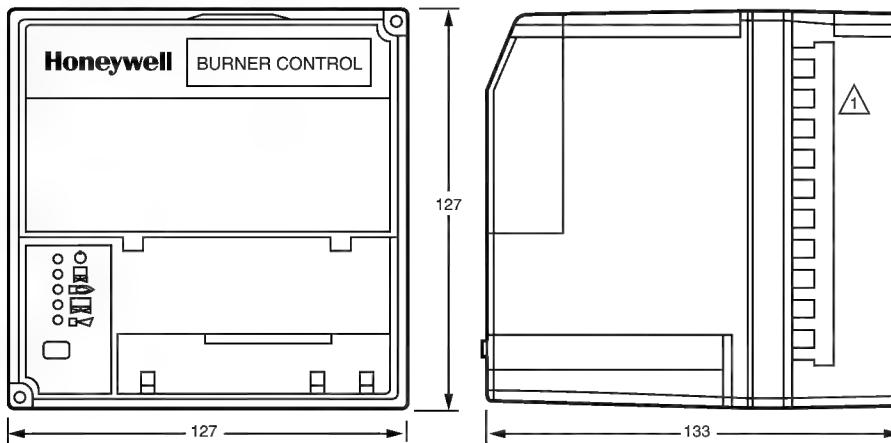
EC7810; EC7820 Primary Control Meeting European Community Timings



Microprocessor-based integrated burner control for automatically fired gas, oil, or combination fuel single burner atmospheric with fan applications. Provides automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics, and troubleshooting.

- Access for external electrical voltage checks.
- Application flexibility and communication interface capability.
- Four LEDs provide sequence information.
- Five function Run/Test Switch.
- Interchangeable plug-in amplifiers.
- Local or remote annunciation of operation and fault information (optional).
- Non-volatile memory retains history files and lockout status after loss of power.
- Compatible with existing Honeywell flame detectors.

Dimension Diagrams



1 REMOVE ONLY FOR TERMINAL TEST ACCESS.

M12821

Preignition: Yes
PrePurge: Determined by ST7800 Purge Timer Card
Pilot Type: Interrupted
Second Stage Pilot Valve: Intermittent
Vibration: 0.5 G environment
Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)
Weight (lb): 1 lb 10 oz (0.7kg)
European Directives: Complies with Gas Appliance Directive (90/269/EEC). Low Voltage Directive (73/23/EEC). EMC Directive (89/336/EEC).

Approvals:
Factory Mutual: Approved: Report No. J.I.OY0A9.AF.
Gastec/European: GASTEC: CE-63AP3070/1, Approved to EN298.
Industrial Risk Insurers: IRI Acceptable.
Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier. ST7800 Plug-in Purge Timer Card.

| Product Number | AirFlow Check | Electrical Ratings, Power Supply | | PostPurge | Flame Establishing Period | | Interlocks | Comments |
|----------------|---------------|----------------------------------|-----------------|-----------|--------------------------------|-----------------|------------|--|
| | | Vac | Hz | | Main | Pilot | | |
| EC7810A1027 | — | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 5 sec | 5 sec or 8 sec or Intermittent | 5 sec or 10 sec | Lockout | 1 ignition attempt, Includes Modulation |
| EC7810A1035 | — | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 5 sec | 5 sec or 8 sec or Intermittent | 5 sec or 10 sec | Lockout | 5 ignition attempts, Includes Modulation |
| EC7820A1026 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 5 sec | 5 sec or 8 sec or Intermittent | 5 sec or 10 sec | Lockout | 1 ignition attempt, Includes Modulation |
| EC7820A1034 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 5 sec | 5 sec or 8 sec or Intermittent | 5 sec or 10 sec | Lockout | 5 ignition attempts, Includes Modulation |

7800 SERIES Relay Modules

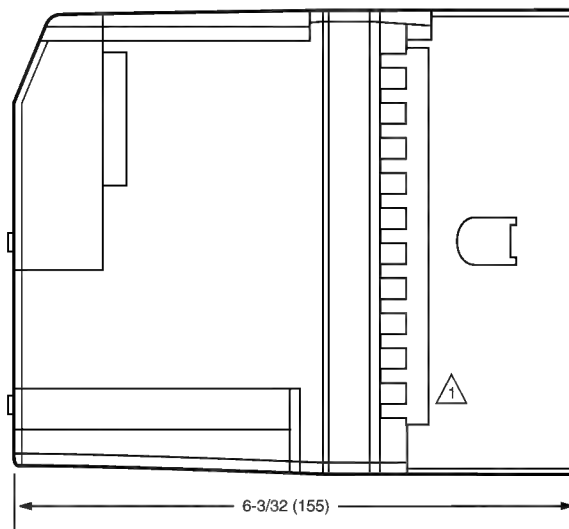
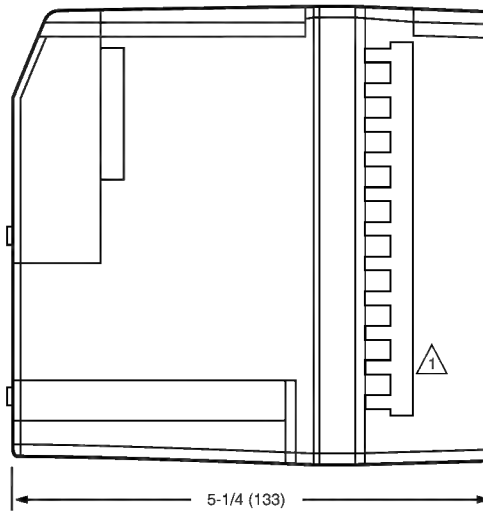
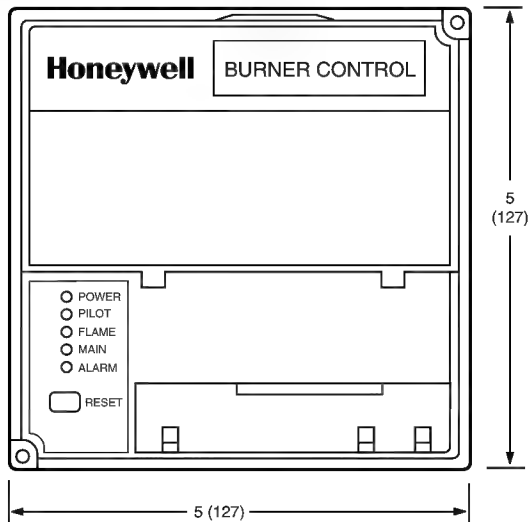
RM7800 Programmers



Microprocessor-based integrated burner control for automatically fired gas, oil, coal or combination fuel single burner applications. Provides safety, functional capability and features beyond conventional controls.

- Functions include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and trouble shooting.
- Access for external electrical voltage checks.
- Application flexibility and communication interface capability.
- Five LEDs provide sequence information.
- Five function Run/Test Switch.
- Interchangeable plug-in flame amplifiers.
- Local or remote annunciation of operation and fault information (optional).
- Non-volatile memory retains history files and lockout status after loss of power.
- Compatible with existing Honeywell flame detectors.
- Includes Keyboard Display Module.

Dimension Diagrams



1 REMOVE ONLY FOR
TERMINAL TEST ACCESS.

M15518

7800 SERIES Relay Modules

Early Spark Termination: Yes, 5 sec
Pilot Type: Interrupted
Preignition: Yes
PrePurge: Determined by ST7800 Purge Timer Card
Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)
Vibration: 0.5 G environment
Weight (lb): 1 lb 10 oz (0.7kg)
Approvals:
Canadian Standards Association: Certified, File No. LR95329-3.

Factory Mutual: Approved: Report No. J.I.1V9AO.AF.
FCC Emissions: FCC Part 15, Class B, Emissions.
Industrial Risk Insurers: IRI Acceptable.
Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.
Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier. ST7800 Plug-in Purge Timer Card.

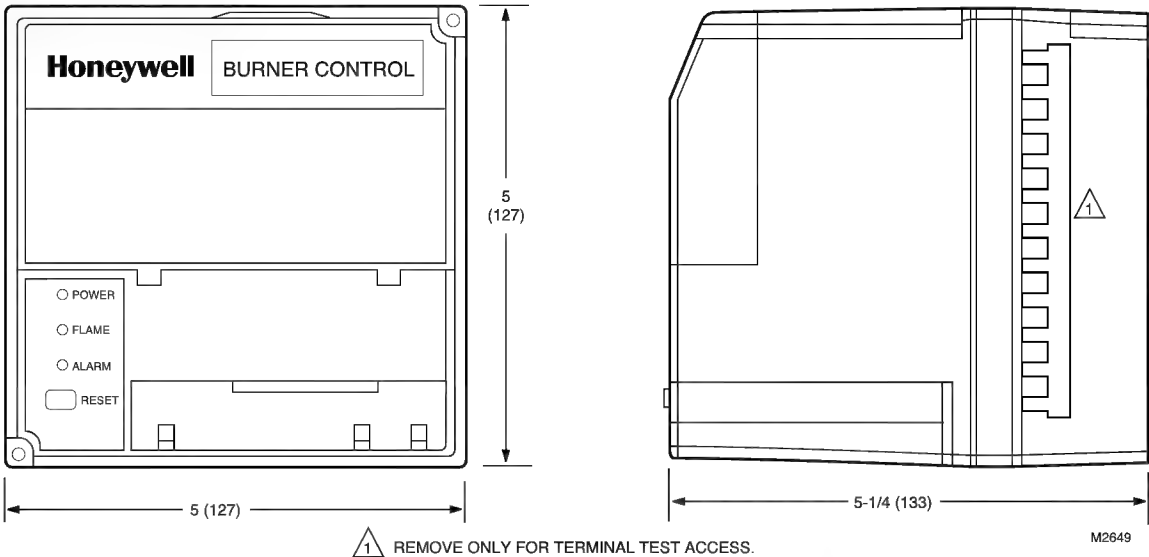
| Product Number | AirFlow Check | Electrical Ratings, Power Supply | | PostPurge | Flame Establishing Period | | Interlocks | Second Stage Pilot Valve | Comments |
|--------------------|---------------|----------------------------------|-----------------|-----------|---|-----------------|------------|--------------------------|--|
| | | Vac | Hz | | Main | Pilot | | | |
| RM7800E1010 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec or 15 sec | 4 sec or 10 sec | Lockout | Interrupted | Includes S7800 Display, LHL-LF/HF Proven |
| RM7800G1018 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec, 15 sec, 30 sec, or Intermittent | 4 sec or 10 sec | Running | Selectable | Includes S7800 Display, LHL-LF Proven |
| RM7800L1012 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec or 15 sec | 4 sec or 10 sec | Lockout | Interrupted | Includes S7800 Display, LHL-LF/HF Proven |
| RM7800L1053 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10/15 sec or Intermittent | 4 sec or 10 sec | Lockout | Intermittent | Includes S7800 Display, LHL-LF/HF Proven |
| RM7800M1011 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec or Intermittent | 4 sec or 10 sec | Running | Intermittent | Includes S7800 Display, On/Off-LF proven |

7800 SERIES Relay Modules

EC7823; RM7823 Flame Switch



Dimension Diagrams



Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)
Vibration: 0.5 G environment
Weight (lb): 1 lb 13 oz (0.8kg)
Approvals:
Factory Mutual: Approved: Report No. J.I.OY0A9.AF.

Industrial Risk Insurers: IRI Acceptable.
Required Components: Q7800A,B Universal Wiring Subbases.
R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier.

| Product Number | Electrical Ratings, Power Supply | | Comments | Description |
|----------------|----------------------------------|-----------------|------------------|--------------|
| | Vac | Hz | | |
| EC7823A1004 | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | Two SPDT outputs | Flame Switch |
| RM7823A1016 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | Two SPDT outputs | Flame Switch |

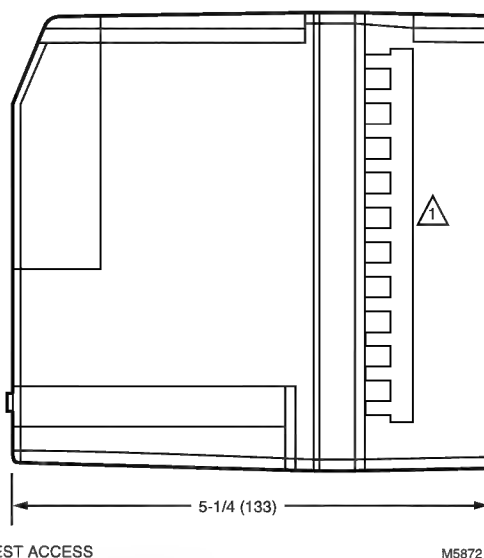
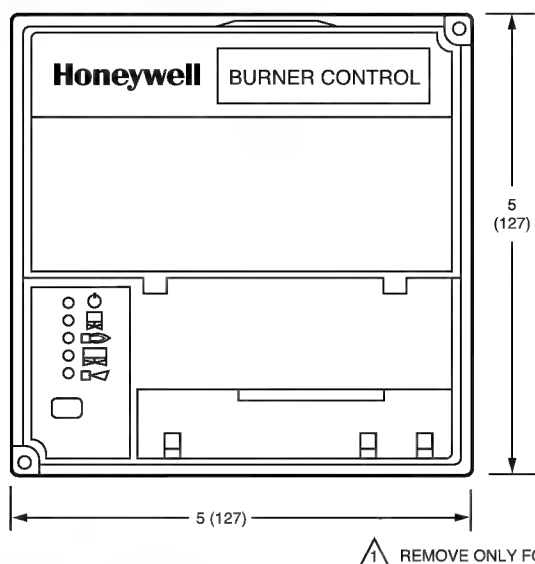
RM7824 On-Off Primary Control



24 Vdc microprocessor-based integrated burner control for automatically fired gas, oil or combination fuel single burner applications. Provides level of safety, functional capability and features beyond the capacity of conventional controls.

- For use with R7824C Amplifier with C7024E,F Flame Detectors and R7848A,B with C7015A Flame Detectors.
- Functions include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Five LEDs provide sequence information.
- Selectable recycle or lockout on loss of flame airflow.
- Shutter drive output for use with dynamic self-check Flame detectors.
- Access for external electrical voltage checks.
- Plug-in flame amplifier.
- Nonvolatile memory retains history files and lockout status after loss of power.

Dimension Diagrams



Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 1 lb 13 oz (0.8kg)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

Factory Mutual: Approved: Report No. J.I.OX4A5.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Required Components: Q7800A,B Universal Wiring Subbases.
R7824 or R7848 Flame Signal Amplifier.

| Product Number | Electrical Ratings, Power Supply (Vac) | Flame Establishing Period | | Pilot Type | Description |
|----------------|--|---------------------------|-----------------|--------------|-----------------------|
| | | Main | Pilot | | |
| RM7824A1006 | 24 Vdc, +7%/-8%. Load:500 VA Max. | Intermittent | 4 sec or 10 sec | Intermittent | Primary Control-24Vdc |

7800 SERIES Relay Modules

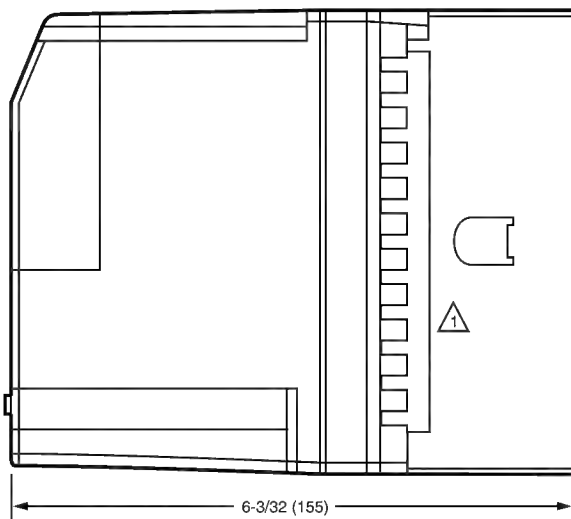
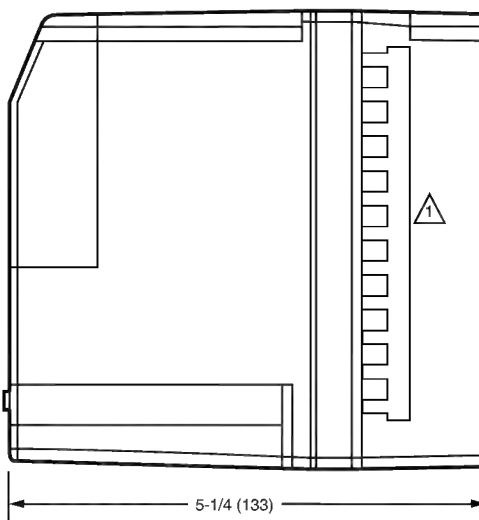
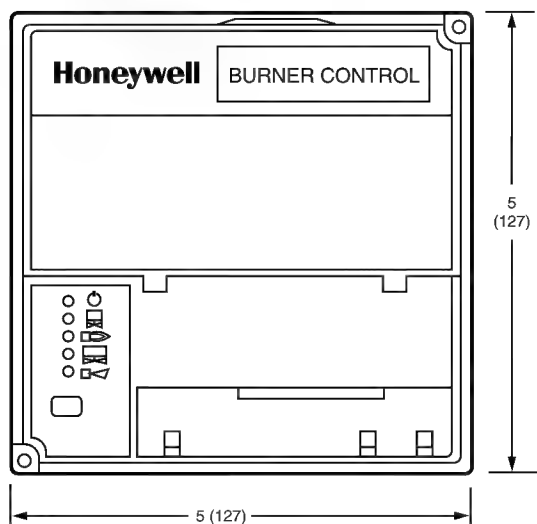
EC7830; EC7850; RM7830; RM7850 Programming Control meeting European Community Timings



Microprocessor-based integrated burner control for full modulation applications. Provides automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics, and troubleshooting.

- Access for external electrical voltage checks.
- Application flexibility and communication interface capability.
- Five LEDs provide sequence information.
- Five function Run/Test Switch.
- Interchangeable plug-in amplifiers.
- Local or remote annunciation of operation and fault information (optional).
- Non-volatile memory retains history files and lockout status after loss of power.
- Compatible with existing Honeywell flame detectors.

Dimension Diagrams



1 REMOVE ONLY FOR
TERMINAL TEST ACCESS.

M15532

7800 SERIES Relay Modules

Preignition: Yes
PrePurge: Determined by ST7800 Purge Timer Card
Pilot Type: Interrupted
Second Stage Pilot Valve: Intermittent
Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)
Vibration: 0.5 G environment
Weight (lb): 1 lb 10 oz (0.7kg)
European Directives: Complies with Gas Appliance Directive (90/396/EEC). Low Voltage Directive (73/23/EEC). EMC Directive (89/336/EEC).

Approvals:
Factory Mutual: Approved: Report No. J.I.1V9AO.AF.
Gastec/European: GASTEC: CE-63AP3070/1, Approved to EN298.
Industrial Risk Insurers: IRI Acceptable.
Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier. ST7800 Plug-in Purge Timer Card.

| Product Number | AirFlow Check | Electrical Ratings, Power Supply | | PostPurge | Flame Establishing Period | | Interlocks | Comments |
|----------------|---------------|----------------------------------|-----------------|------------------------------|--------------------------------|----------------|------------|-------------------|
| | | Vac | Hz | | Main | Pilot | | |
| EC7830A1033 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 2 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | — |
| EC7830A1041 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 30 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | — |
| EC7830A1066 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | — |
| EC7850A1064 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 30 sec, dynamic damper check | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | LHL-LF/HF Proven |
| EC7850A1072 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 2 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | LHL- LF/HF Proven |
| EC7850A1080 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 30 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | LHL-LF/HF Proven |
| EC7850A1122 | Selectable | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | LHL-LF/HF Proven |
| RM7830A1003 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 2 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | — |
| RM7830A1011 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | — |
| RM7830A1029 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 30 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | — |
| RM7850A1001 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 2 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | LHL- LF/HF Proven |
| RM7850A1019 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | LHL-LF/HF Proven |
| RM7850A1027 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 30 sec | 3 sec or 5 sec or Intermittent | 3 sec or 5 sec | Lockout | LHL- LF/HF Proven |

7800 SERIES Relay Modules

RM7838A Manual Start Industrial Primary Control with Purge



Microprocessor-based integrated burner control for industrial semi-automatically fired gas, oil, coal or combination fuel single burner applications. Provides level of safety, functional capability and features beyond conventional controls.

Dimension Diagrams

See diagram on page 20

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Pilot Type: Intermittent

PrePurge: Determined by ST7800 Purge Timer Card

Weight (lb): 1 lb 10 oz (0.7kg)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

- Functions include purge, burner pilot startup, flame supervision, system status indication, system or self diagnosis and troubleshooting.
- Delays admission of fuel to combustion chamber until pilot flame has been proven and then monitors the flame through the run period while providing system status indication.
- Includes Keyboard Display Module.
- Five LEDs provide sequence information.
- Intermittent pilot valve.
- Interchangeable plug-in flame amplifier.
- Access for external electrical voltage checks.
- Non-volatile memory retains history files and lockout status after loss of power.
- Selectable pilot flame establishing period.
- Provides application flexibility and optional communication interface capability.
- Compatible with existing Honeywell flame detectors.

Control Safety Devices: Acceptable: CSD-1.

Factory Mutual: Approved: Report No. J.I.OX4A5.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Required Components: Q7800A,B Universal Wiring Subbases.

R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal

Amplifier. ST7800 Plug-in Purge Timer Card.

| Product Number | Electrical Ratings, Power Supply | | Flame Establishing Period | | Interlocks | Comments |
|----------------|----------------------------------|-----------------|---------------------------|-----------------|------------|--|
| | Vac | Hz | Main | Pilot | | |
| RM7838A1014 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | Intermittent | 4 sec or 10 sec | Running | Includes S7800 Display, and Purge Function |

RM7838B,C Manual Start Industrial Programmers

Microprocessor-based integrated burner control with pilot hold function for industrial semi-automatically fired gas, oil, coal or combination fuel single burner applications. Provides level of safety, functional capability and features beyond conventional controls. C alarms only on safety shutdown and requires ST7800C Purge Timers.

- Functions include automatic modulated high fire and low fire proven purge, burner pilot start up with pilot valve hold, special pilot valve hold from the Run condition, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Access for external electrical voltage checks.

Dimension Diagrams

See diagram on page 20

Early Spark Termination: Yes, 5 sec

Preignition: Yes

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Pilot Type: Selectable

PrePurge: Determined by ST7800 Purge Timer Card

Vibration: 0.5 G environment

Weight (lb): 1 lb 10 oz (0.7kg)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

- Application flexibility and communication interface capability.

- Five LEDs provide sequence information.

- Five function Run/Test Switch.

- Interchangeable plug-in flame amplifiers.

- Local or remote annunciation of operation and fault information.

- Non-volatile memory retains history files and lockout status after loss of power.

- Compatible with existing Honeywell flame detectors.

- Includes Keyboard Display Module.

- Pilot Valve Hold function requires R7847C R7861A or R7886A Plug-in Flame Signal Amplifiers.

Control Safety Devices: Acceptable: CSD-1.

Factory Mutual: Approved: Report No. J.I.OX4A5.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Required Components: Q7800A,B Universal Wiring Subbases.

R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal

Amplifier. ST7800 Plug-in Purge Timer Card.

| Product Number | Electrical Ratings, Power Supply | | Flame Establishing Period | | Interlocks | Comments |
|----------------|----------------------------------|-----------------|---------------------------|-----------------|------------|------------------------|
| | Vac | Hz | Main | Pilot | | |
| RM7838B1013 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec or Intermittent | 4 sec or 10 sec | Lockout | Includes S7800 Display |
| RM7838C1004 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec or Intermittent | 15 second | Lockout | Includes S7800 Display |

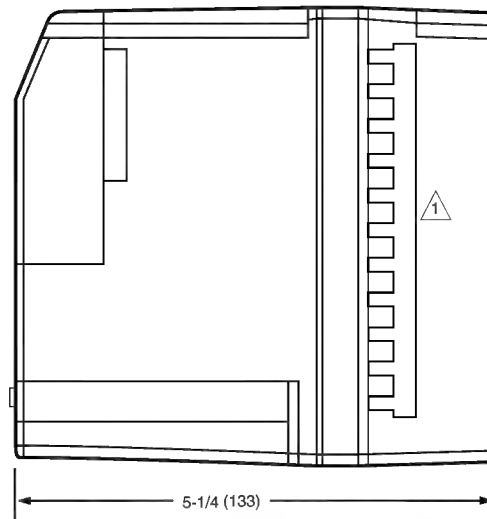
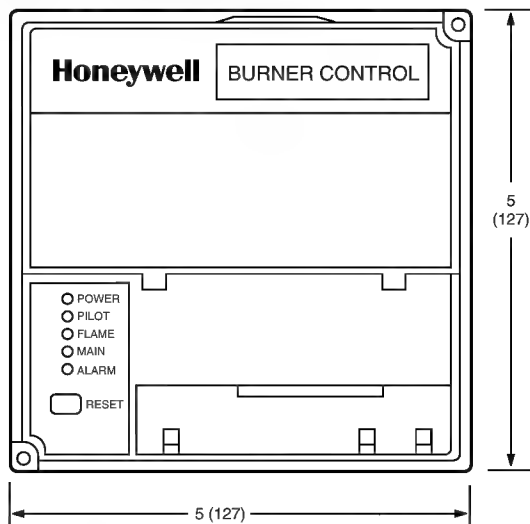
RM7840 Programmers



Microprocessor-based integrated burner control for automatically fired gas, oil, coal or combination fuel single burner applications. Provides safety, functional capability and features beyond conventional controls.

- Functions include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Access for external electrical voltage checks.
- Application flexibility and communication interface capability.
- Five LEDs provide sequence information.
- Five function Run/Test Switch.
- Interchangeable plug-in flame amplifiers.
- Local or remote annunciation of RM7840 operation and fault information.
- Non-volatile memory retains history files and lockout status after loss of power.
- Compatible with existing Honeywell flame detectors.

Dimension Diagrams



REMOVE ONLY FOR TERMINAL TEST ACCESS.

M5003A

Early Spark Termination: Yes, 5 sec

Preignition: Yes

PrePurge: Determined by ST7800 Purge Timer Card

PostPurge: 15 sec

Pilot Type: Interrupted

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 1 lb 13 oz (0.8kg)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

Control Safety Devices: Acceptable: CSD-1.

Factory Mutual: Approved: Report No. J.I.OX4A5.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier. ST7800 Plug-in Purge Timer Card.

| Product Number | AirFlow Check | Electrical Ratings, Power Supply | | PostPurge | Flame Establishing Period | | Interlocks | Second Stage Pilot Valve | Comments |
|----------------|---------------|----------------------------------|-----------------|-----------|--|-----------------|------------|--------------------------|------------------|
| | | Vac | Hz | | Main | Pilot | | | |
| RM7840E1016 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec or 15 sec | 4 sec or 10 sec | Lockout | Interrupted | LHL-LF/HF Proven |
| RM7840G1014 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec, 15 sec, 30 sec or Intermittent | 4 sec or 10 sec | Running | Selectable | LHL-LF Proven |
| RM7840L1018 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec or 15 sec | 4 sec or 10 sec | Lockout | Interrupted | LHL-LF/HF Proven |
| RM7840L1026 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec, or 15 sec, or Intermittent | 4 sec or 10 sec | Lockout | Intermittent | LHL-LF/HF Proven |
| RM7840M1017 | Selectable | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 10 sec or Intermittent | 4 sec or 10 sec | Running | Intermittent | On/Off-LF Proven |

7800 SERIES Relay Modules

EC7885; RM7885 Manual Start industrial Primary Control



Microprocessor-based integrated burner control for industrial semi-automatically fired gas, oil, coal, or combination fuel single burner applications. Provides level of safety, functional capability and features beyond conventional controls.

Dimension Diagrams

See Diagram on page 27

Ambient Temperature Rating-40 F to 140 F: (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 1 lb 13 oz (0.8kg)

- Functions include flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Adaptable to continuous firing, high-low or modulating firing rate for semi-automatic burner sequencing.
- Operates with the following:
 - Torch-ignited main burner or torch-ignited pilot using S445A Start-Stop Station, or conventional knee or foot operated station.
 - Direct-ignition oil burner or electrically ignited pilot, using S445A Start-Stop Station.
- Five LEDs provide sequence information.
- Non-volatile memory.
- Flame signal check during standby.
- Shutter drive output.
- Compatible with existing Honeywell flame detectors.
- Terminal provided for external alarm to sound on flame failure.

Approvals:

Factory Mutual: Approved: Report No. J.I.OX4A5.AF.

Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier.

| Product Number | Electrical Ratings, Power Supply | | Flame Establishing Period - Pilot | Pilot Type | Description |
|----------------|----------------------------------|-----------------|-----------------------------------|--------------|---|
| | Vac | Hz | | | |
| EC7885A1011 | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 min | Intermittent | Manual Start Industrial Primary Control |
| RM7885A1015 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 min | Intermittent | Manual Start Industrial Primary Control |

RM7888 PLC Adaptable Primary Control



Microprocessor-based integrated burner control for industrial process semi-automatically fired gas, oil, coal, or combination fuels for single and multiple burner applications. Provides level of safety, functional capability and features beyond conventional controls.

Dimension Diagrams
See diagram on page 27

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)
Vibration: 0.5 G environment
Weight (lb): 1 lb 10 oz (0.7kg)
Approvals:
Canadian Standards Association: Certified

- Functions include automatic burner startup sequencing, five user select-able run sequences, four line-voltage sequence control inputs, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Requires a relay module, subbase, and amplifier for operation.
- Options include PC interface, keyboard display module, DATA CONTROLBUS™ MODULE, remote display mounting, first-out expanded annunciator, and COMBUSTION SYSTEM MANAGER™ software.
- Use with master system control which determines purge timing and confirms air supply and air flow.
- Nonvolatile memory retains history files and sequencing status after power loss.
- Optional remote reset capability.
- Five LEDs provide sequence information.
- Interchangeable plug-in flame amplifiers.
- Local or remote annunciation of operation and fault information.

Factory Mutual: Approved.

Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier.

| Product Number | Electrical Ratings, Power Supply | | Flame Establishing Period | | Pilot Type | Comments | Description |
|----------------|----------------------------------|--------------------|---------------------------|-----------------|------------|---|-------------------------------|
| | Vac | Hz | Main | Pilot | | | |
| RM7888A1019 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 4 sec or 10 sec | Selectable | Selectable sequences | PLC Adaptable Primary Control |
| RM7888A1027 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec | 4 sec or 10 sec | Selectable | For 10 sec DSI applications, selectable sequences | PLC Adaptable Primary Control |

7800 SERIES Relay Modules

EC7890; RM7890 On-Off Primary Controls



Microprocessor-based integrated primary burner control for automatically fired gas, oil or combination fuel single burner applications. Provides level of safety, functional capability and features beyond conventional controls.

Dimension Diagrams

See diagram on page 27

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 1 lb 13 oz (0.8kg)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

Factory Mutual: Approved: Report No. J.I.1V9AO.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

- Functions include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Subbase and amplifier are required for operation.
- Options include PC interface, keyboard display module, DATA CONTROLBUS™ MODULE, remote display module, first-out expanded annunciator, and COMBUSTION SYSTEM MANAGER™ software.
- Five LEDs provide sequence information.
- Interchangeable plug-in flame amplifiers.
- Optional local or remote annunciation of operation and fault information.
- Nonvolatile memory retains history files and sequencing status after power loss.
- Optional remote reset capability.
- Optional report generation.
- Selectable relight or lockout on loss of flame.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier.

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

221729A Dust Cover for 7800 Relay Modules

221729A Dust Cover for 7800 Relay Modules

| Product Number | Electrical Ratings, Power Supply | | Flame Establishing Period - Pilot | Pilot Type | Comments |
|----------------|----------------------------------|-----------------|-----------------------------------|--------------|--|
| | Vac | Hz | | | |
| EC7890A1011 | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 4 sec or 10 sec | Intermittent | — |
| EC7890A1029 | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 4 sec or 10 sec | Intermittent | — |
| EC7890B1010 | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 4 sec or 10 sec | Intermittent | — |
| EC7890B1028 | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 4 sec or 10 sec | Intermittent | Includes Shutter Drive Capability |
| RM7890A1015 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 4 sec or 10 sec | Intermittent | — |
| RM7890A1031 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 30 sec | Intermittent | — |
| RM7890A1049 | 100 Vac (+10/-15%) | 50/60 Hz (±10%) | 4 sec or 10 sec | Intermittent | — |
| RM7890B1014 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 4 sec or 10 sec | Intermittent | Includes Shutter Drive Capability |
| RM7890B1030 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | Fixed 4 sec or 10 sec PFEP | Intermittent | Includes Shutter Drive Capability, Alarm sounds when Reset pushed. |
| RM7890C1005 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | — | — | Standing Pilot Applications |
| RM7890D1004 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 15 sec or 30 sec | Intermittent | Higher Flame Sensor Voltage for Infrared Heater Applications |

EC7895A,C; RM7895 On-Off Primary Control with Prepurge



Microprocessor-based integrated primary burner control for automatically fired gas, oil, or combination fuel single burner applications. Provides level of safety, functional capability and features beyond conventional controls.

Dimension Diagrams
See diagram on page 27

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

PrePurge: Determined by ST7800 Purge Timer Card

Vibration: 0.5 G environment

Weight (lb): 1 lb 15 oz (0.9kg)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

Factory Mutual: Approved: Report No. J.I.1V9AO.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

- Functions include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Subbase, amplifier, and prepurge timer are required for operation.
- Options include PC interface, keyboard display module, DATA CONTROLBUS™ MODULE, remote display module, first-out expanded annunciator, and COMBUSTION SYSTEM MANAGER™ software.
- Five LEDs provide sequence information.
- Interchangeable plug-in flame amplifiers.
- Optional local or remote annunciation of operation and fault information.
- Nonvolatile memory retains history files and sequencing status after power loss.
- Optional remote reset capability.
- Optional report generation.
- Selectable relight or lockout on loss of flame.
- Airflow switch check.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier. ST7800 Plug-in Purge Timer Card.

| Product Number | AirFlow Check | Electrical Ratings, Power Supply | | Flame Establishing Period | | Delayed Main Valve | Interlocks | Pilot Type | Comments |
|----------------|---------------|----------------------------------|-----------------|---------------------------|------------------|--------------------|------------|--------------|--|
| | | Vac | Hz | Main | Pilot | | | | |
| EC7895A1010 | No | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | — | 4 sec or 10 sec | No | Selectable | Intermittent | — |
| EC7895C1000 | No | 220-240 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec | 4 sec or 10 sec | Yes | Selectable | Interrupted | — |
| RM7895A1014 | — | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | — | 4 sec or 10 sec | No | Selectable | Intermittent | — |
| RM7895A1048 | — | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | — | 4 sec or 10 sec | No | Selectable | Intermittent | Includes ignition cut-out during PFEP |
| RM7895B1013 | Dynamic | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | — | 4 sec to 10 sec | No | Selectable | Intermittent | — |
| RM7895C1012 | — | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec | 4 sec or 10 sec | Yes | Selectable | Interrupted | — |
| RM7895C1020 | — | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec | 10 sec | Yes | Selectable | Interrupted | Includes ignition cut-out during PFEP |
| RM7895D1011 | Dynamic | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec | 4 sec or 10 sec | Yes | Selectable | Interrupted | — |
| RM7895E1002 | — | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | — | 15 sec or 30 sec | Yes | Selectable | Intermittent | Higher Flame Sensor Voltage for Infrared Heater Applications |
| RM7895F1001 | Dynamic | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | 10 sec | 15 sec or 30 sec | Yes | Selectable | Interrupted | Higher Flame Sensor Voltage for Infrared Heater Applications |

7800 SERIES Relay Modules

RM7896 On-Off Primary Control with Pre- and Post-Purge



Microprocessor-based integrated full-function primary burner control for automatically fired gas, oil, or combination fuel single burner applications. Provides level of safety, functional capability and features beyond conventional controls.

Dimension Diagrams

See diagram on page 27

PostPurge: 15 sec

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

PrePurge: Determined by ST7800 Purge Timer Card

Vibration: 0.5 G environment

Electrical Ratings, Power Supply (Vac): 120 Vac (+10/-15%)

Electrical Ratings, Power Supply (Hz): 50/60 Hz (±10%)

Weight (lb): 1 lb 15 oz (0.9kg)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

- Functions include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Subbase, amplifier and purge card are required for operation.
- Options include PC interface, keyboard display module, DATA CONTROLBUS™ MODULE, remote display module, first-out expanded annunciator, and COMBUSTION SYSTEM MANAGER™ software.
- 15 second postpurge.
- Five LEDs provide sequence information.
- Interchangeable plug-in flame amplifiers.
- Local or remote annunciation of operation and fault information.
- Nonvolatile memory retains history files and sequencing status after power loss.
- Optional remote reset capability.
- Optional report generation.
- Selectable recycle or lockout on loss of airflow or flame.
- Shutter drive output.
- Airflow switch check.
- Delayed main valve.

Factory Mutual: Approved: Report No. J.I.OX4A5.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Required Components: Q7800A,B Universal Wiring Subbases. R7847, R7848, R7849, R7851, R7861, or R7886 Flame Signal Amplifier. ST7800 Plug-in Purge Timer Card.

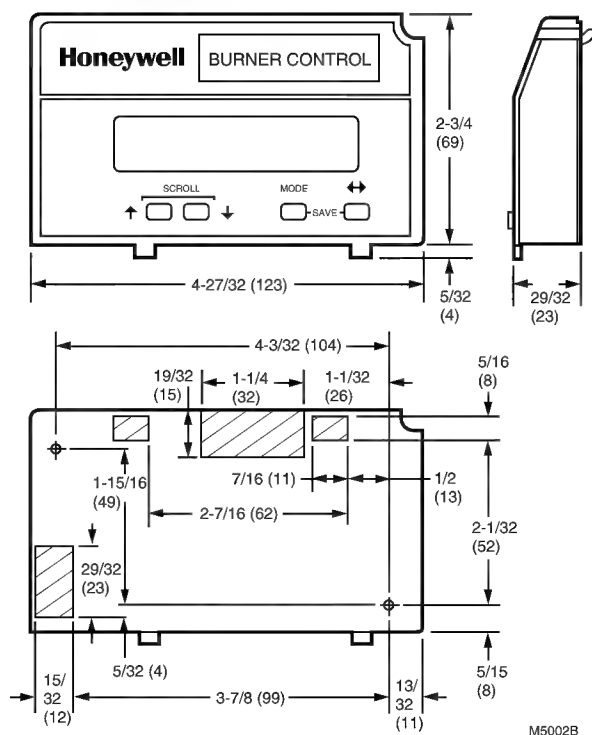
| Product Number | AirFlow Check | PostPurge | Flame Establishing Period | | Delayed Main Valve | Interlocks | Pilot Type | Comments |
|----------------|---------------|-----------|---------------------------|-----------------|--------------------|------------|--------------|--------------------------------|
| | | | Main | Pilot | | | | |
| RM7896A1012 | — | 15 sec | — | 4 sec or 10 sec | No | Selectable | Intermittent | Includes Pre- and Post -Purge. |
| RM7896B1011 | Dynamic | 15 sec | — | 4 sec or 10 sec | No | Selectable | Intermittent | Includes Pre- and Post -Purge. |
| RM7896C1010 | — | 15 sec | 10 sec | 4 sec or 10 sec | Yes | Selectable | Interrupted | Includes Pre- and Post -Purge. |
| RM7896D1019 | Dynamic | 15 sec | 10 sec | 4 sec or 10 sec | Yes | Selectable | Interrupted | Includes Pre- and Post -Purge. |
| RM7896D1027 | Dynamic | 60 sec | 10 sec | 4 sec or 10 sec | Yes | Selectable | Interrupted | Includes Pre- and Post -Purge. |

S7800 Keyboard Display Module



Provides current status of burner sequence, timing information, hold information and lockout information, as well as selectable or preemptive messages.

Dimension Diagrams



- Application flexibility.
- Communication interface capability.
- Dependable, long-term operations provided by microcomputer technology.
- First-out annunciation and system diagnostics provided by 2 row by 20 column Vacuum Fluorescent Display (VFD).
- Local or remote annunciation of operation and fault information.
- First out expanded annunciation with 24 limit and interlock LEDs enhances keyboard display module information.
- Provides burner controller data.
- Remote reset.
- Report generation.

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 4 oz (113 g)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

Factory Mutual: Approved: Report No. J.I.1V9AO.AF.

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Accessories:

206311 Carrying Case for S7800 Display

203541 Five (5) Wire Connector for S7800 Display

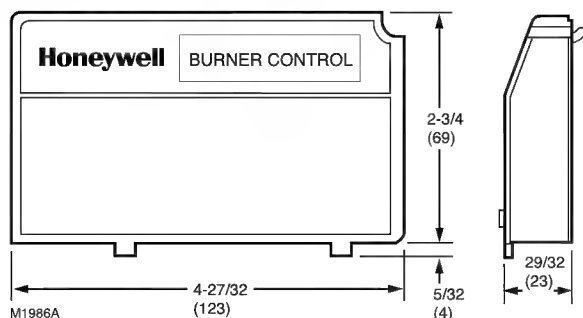
| Product Number | Electrical Ratings, Power Supply - Vac | Comments | Description |
|----------------|--|---------------------|-----------------------------|
| S7800A1001 | 13 Vdc peak fullwave rectified (+20/-15%). | English Language | Keyboard Display-English |
| S7800A1035 | 13 Vdc peak fullwave rectified (+20/-15%). | French Language | Keyboard Display-French |
| S7800A1043 | 13 Vdc peak fullwave rectified (+20/-15%). | German Language | Keyboard Display-German |
| S7800A1050 | 13 Vdc peak fullwave rectified (+20/-15%). | Italian Language | Keyboard Display-Italian |
| S7800A1068 | 13 Vdc peak fullwave rectified (+20/-15%). | Spanish Language | Keyboard Display-Spanish |
| S7800A1126 | 13 Vdc peak fullwave rectified (+20/-15%). | Portuguese Language | Keyboard Display-Portuguese |

Display Modules

S7810A Data ControlBus Module



Dimension Diagrams



Supports remote mounting of S7800 Keyboard Display Module, personal computer communications interface and remote reset.

- Use with remotely mounted S7800 Keyboard Display Module.
- Installs directly on the front of 7800 SERIES Relay Modules.
- Provides communications bus interface and remote reset.

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 4 oz (113 g)

Approvals:

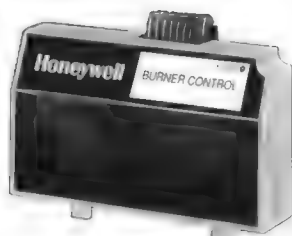
Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Replacement Parts:

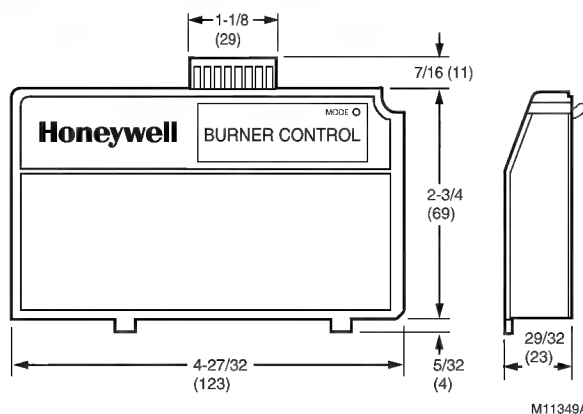
203541 Five (5) Wire Connector for S7800 Display

| Product Number | Electrical Ratings, Power Supply - Vac | Comments | Description |
|-------------------|--|----------------------------------|-----------------------|
| S7810A1009 | 13 Vdc peak fullwave rectified (+20/-15%). | Includes 203541 5-wire Connector | ControlBus(tm) Module |

S7810B Multi-Drop Switch Module



Dimension Diagrams



Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 4 oz (113 g)

Approvals:

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

Supports remote mounting of a Keyboard Display Module, personal communications interface for multi-dropped 7800 SERIES subnetworks, and remote reset.

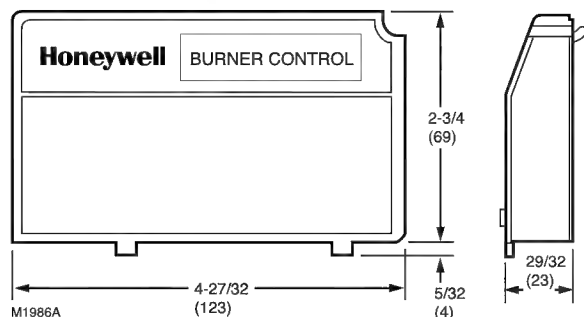
- Multi-dropped communications bus interface.
- Remote reset.
- Ability to remotely mount a Keyboard Display Module.

| Product Number | Electrical Ratings, Power Supply - Vac | Comments | Description |
|-------------------|--|--|-----------------------|
| S7810B1007 | 13 Vdc peak fullwave rectified (+20/-15%). | Includes 208727 8 pin electrical connector | ControlBus(tm) Module |

S7810M ModBus Module

Supports remote mounting of a Keyboard Display Module, personal computer PLC interface for multi-dropped 7800 SERIES subnetworks, and remote reset.

Dimension Diagrams



- Multi-dropped communications bus interface.
- Remote reset.
- Ability to remotely mount a Keyboard Display Module.

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 4 oz (113 g)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

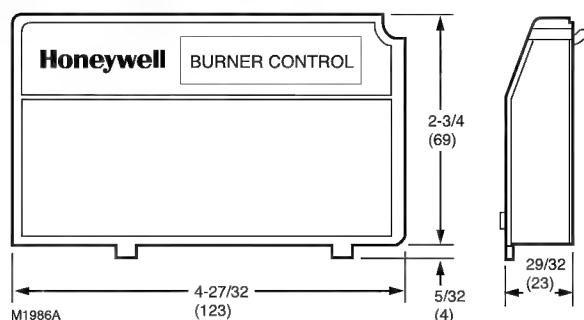
Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

| Product Number | Electrical Ratings, Power Supply - Vac | Comments | Description |
|----------------|--|--|---|
| S7810M1003 | 13 Vdc peak fullwave rectified (+20/-15%). | Includes 208727 8 pin electrical connector | ControlBus(tm) Module-MODBUS |
| S7810M1029 | 13 Vdc peak fullwave rectified (+20/-15%). | Includes 208727 8 pin electrical connector | ControlBus(tm) Module-MODBUS - CE Certified |

S7820 Remote Reset Module



Dimension Diagrams



Serves as link between remote reset pushbutton and relay module. Allows 7800 SERIES relay module to be reset from a remote location.

- Reset button can be installed up to 1000 feet away.
- Installs directly on the front of 7800 SERIES relay module.

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 3 oz (113 g)

Approvals:

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ.

| Product Number | Comments | Description |
|----------------|----------------------------------|---------------------|
| S7820A1007 | Includes 203541 5-wire Connector | Remote Reset Module |

Display Modules

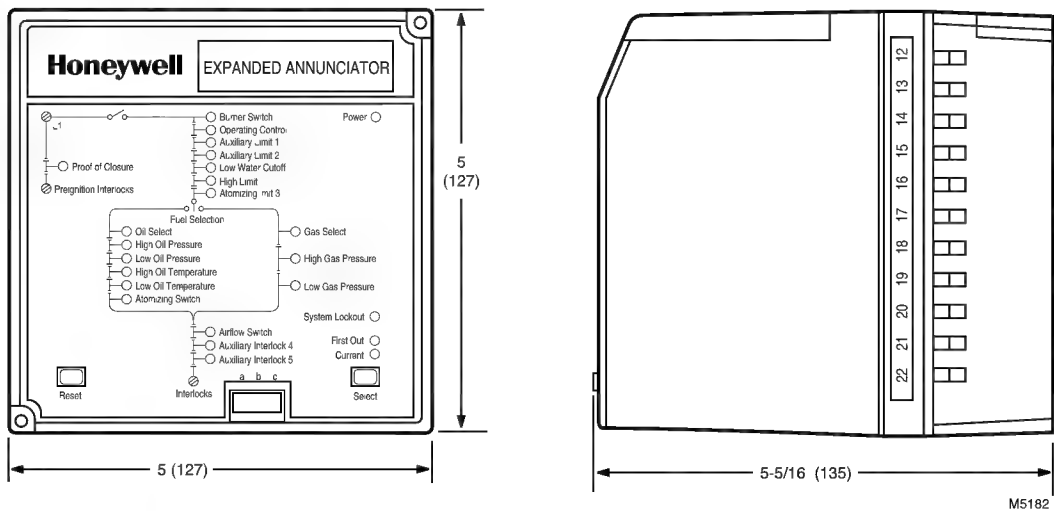
S7830 First Out Expanded Annunciator



Microprocessor-based expanded annunciator to support the 7800 SERIES relay modules for first-out annunciation, sequencing, system or self-diagnostics and troubleshooting.

- Twenty-six status LEDs.
- Front panel LED array—arranged to indicate flow of line-voltage through string of limits, controls and interlocks.
- Selectable current and first-out LED array display status.
- Twenty-one monitored contact points.
- Access for external electrical voltage checks.

Dimension Diagrams



Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)
Vibration: 0.5 G environment
Weight (lb): 1 lb. 6oz (0.6k)
Approvals:
Canadian Standards Association: Certified, File No. LR95329.

FCC Emissions: FCC Part 15, Class B, Emissions.
Industrial Risk Insurers: IRI Acceptable.
Underwriters Laboratories, Inc: File No. MH17367; Guide No. MJAT.
Required Components: 7800 SERIES Relay Modules and Q7800A, B Subbases

| Product Number | Electrical Ratings, Power Supply | | Description |
|----------------|----------------------------------|-----------------|---|
| | Vac | Hz | |
| S7830A1005 | 120 Vac (+10/-15%) | 50/60 Hz (±10%) | Expanded Annunciator for RM78xx SERIES Controls |

ST7800 Plug In Purge Timer



Provides the prepurge timing for select 7800 SERIES relay modules. ST7800C used with the RM7838C only.

| Product Number | PrePurge | Comments | Description |
|----------------|--------------|------------------|--------------------------------------|
| ST7800A1005 | 2 seconds | — | Purge Timer, 2 seconds |
| ST7800A1013 | 7 seconds | — | Purge Timer, 7 seconds |
| ST7800A1021 | 10 seconds | — | Purge Timer, 10 seconds |
| ST7800A1039 | 30 seconds | — | Purge Timer, 30 seconds |
| ST7800A1047 | 40 seconds | — | Purge Timer, 40 seconds |
| ST7800A1054 | 60 seconds | — | Purge Timer, 60 seconds |
| ST7800A1062 | 90 seconds | — | Purge Timer, 90 seconds |
| ST7800A1070 | 2.5 minutes | — | Purge Timer, 2.5 minutes |
| ST7800A1088 | 4.0 Minutes | — | Purge Timer, 4.0 minutes |
| ST7800A1096 | 6.0 minutes | — | Purge Timer, 6.0 minutes |
| ST7800A1104 | 9.0 minutes | — | Purge Timer, 9.0 minutes |
| ST7800A1112 | 12.0 minutes | — | Purge Timer, 12.0 minutes |
| ST7800A1120 | 15.0 minutes | — | Purge Timer, 15.0 minutes |
| ST7800A1138 | 22.0 minutes | — | Purge Timer, 22.0 minutes |
| ST7800A1146 | 30.0 minutes | — | Purge Timer, 30.0 minutes |
| ST7800C1003 | 7 seconds | For RM7838C Only | Purge Timer 7 sec. for RM7838C Only |
| ST7800C1011 | 20 seconds | For RM7838C Only | Purge Timer 20 sec. for RM7838C Only |
| ST7800C1029 | 4.0 Minutes | For RM7838C Only | Purge Timer 4 min. for RM7838C Only |
| ST7800C1037 | 6.0 minutes | For RM7838C Only | Purge Timer 6 min. for RM7838C Only |
| ST7800C1045 | 8.0 minutes | For RM7838C Only | Purge Timer 8 min. for RM7838C Only |
| ST7800C1052 | 10.0 minutes | For RM7838C Only | Purge Timer 10 min. for RM7838C Only |
| ST7800C1060 | 12.0 minutes | For RM7838C Only | Purge Timer 12 min. for RM7838C Only |
| ST7800C1078 | 14.0 minutes | For RM7838C Only | Purge Timer 14 min. for RM7838C Only |
| ST7800C1086 | 16.0 minutes | For RM7838C Only | Purge Timer 16 min. for RM7838C Only |
| ST7800C1094 | 18.0 minutes | For RM7838C Only | Purge Timer 18 min. for RM7838C Only |
| ST7800C1102 | 20.0 minutes | For RM7838C Only | Purge Timer 20 min. for RM7838C Only |
| ST7800C1110 | 22.0 minutes | For RM7838C Only | Purge Timer 22 min. for RM7838C Only |
| ST7800C1128 | 24.0 minutes | For RM7838C Only | Purge Timer 24 min. for RM7838C Only |
| ST7800C1136 | 30.0 minutes | For RM7838C Only | Purge Timer 30 min. for RM7838C Only |
| ST7800C1144 | 45.0 minutes | For RM7838C Only | Purge Timer 45 min. for RM7838C Only |

Wiring Subbase

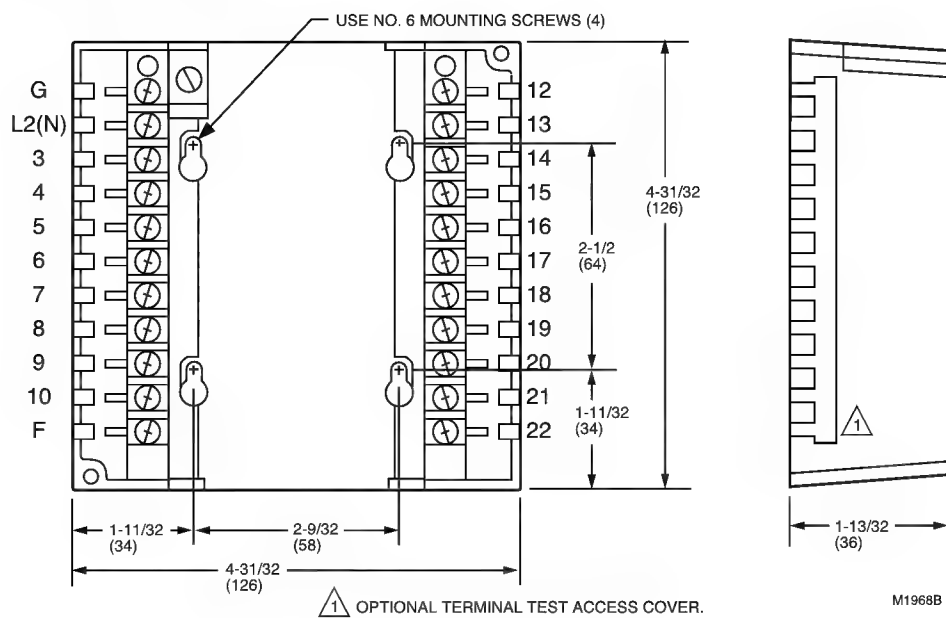
Q7800 22 Terminal Universal Wiring Subbases

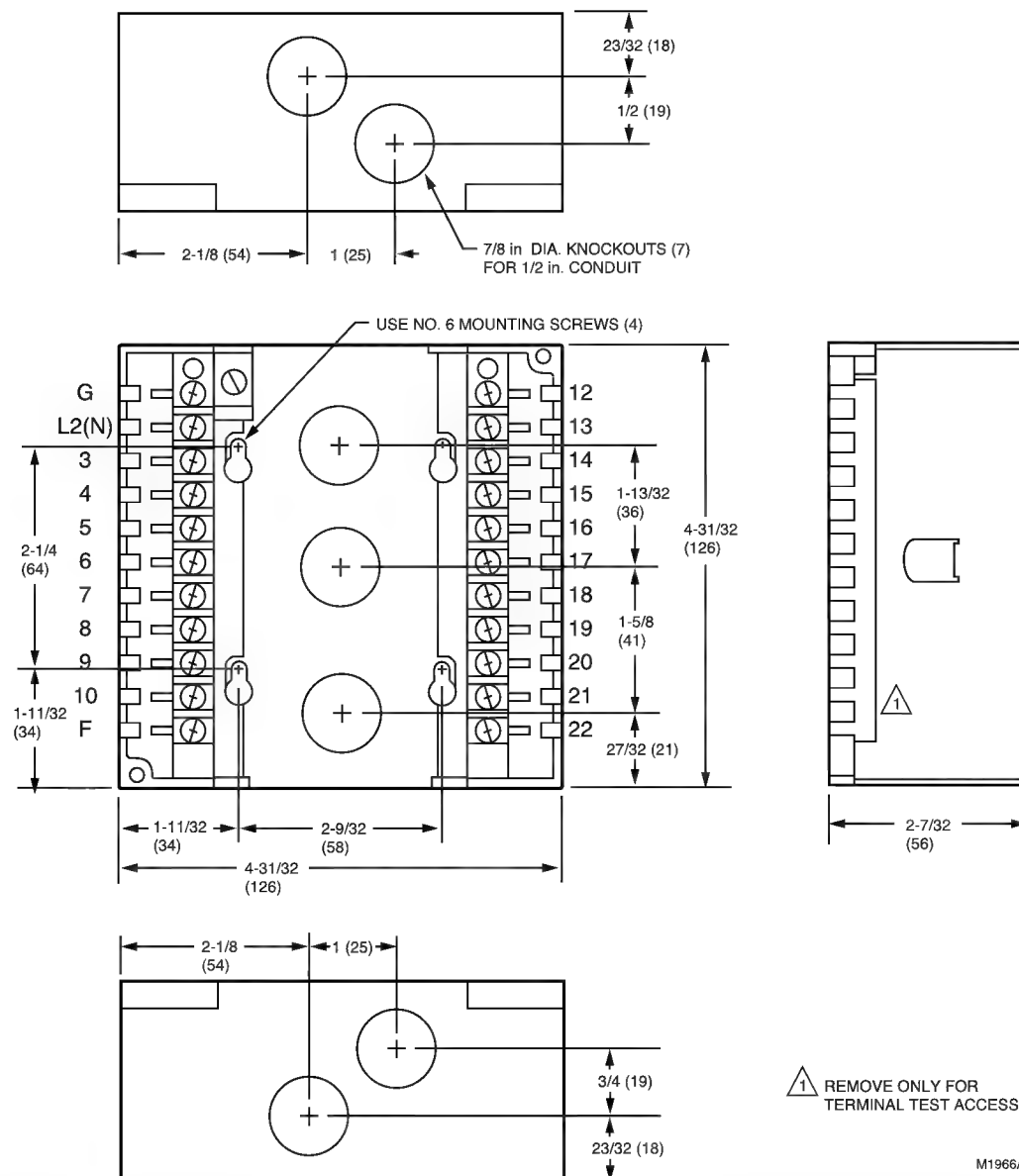


Burner, panel or wall mount subbases for 7800 SERIES relay modules and S7830A Expanded Annunciator.

- Makes electrical connections for 7800 SERIES relay modules or S7830A Expanded Annunciator through bifurcated contacts.
- Provides terminals for field wiring.
- Twenty-two terminals.

Dimension Diagrams





M1966A

Ambient Temperature Rating: -40 F to 140 F (-40 C to 60 C)

Vibration: 0.5 G environment

Weight (lb): 7 oz (200g)

Approvals:

Canadian Standards Association: Certified, File No. LR95329-3.

Underwriters Laboratories, Inc: Component Recognized, File No. MP268; Guide No. MCCZ2.

| Product Number | Description |
|----------------|---|
| Q7800A1005 | Panel mount |
| Q7800B1003 | Burner/wall mount 2 knockouts each end |
| Q7800B1011 | Burner/wall mount 3 knockouts each end |
| Q7800F1004 | Burner/wall mount adapter subbase for RA890 |
| Q7800F1012 | Burner/wall mount adapter subbase for R4795 |

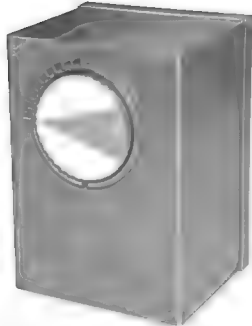
Parts and Accessories

7800 Series Accessories or Parts

| OS Number | Description | Used With |
|--------------|--|--------------------|
| 221779 | Terminal Slot Cover for Q7800 | Q7800 |
| 120934 | Mounting Flange for CR7890 Burner Control | CR7890 |
| 203541 | Five (5) Wire Connector for S7800 Display | S7800 Display |
| 203765 | Remote Mounting Bracket for S7800 Display | S7800 |
| 206311 | Carrying Case for S7800 Display | S7800 Display |
| 203968A | Plug-In Power Supply (13Vdc) for remote mounting S7800 Display | S7800 Display |
| 204718A | NEMA 4 Cover Assembly for Mounting S7800 Display | S7800 Display |
| 204718B | NEMA 1 Cover Assembly for Mounting S7800 Display | S7800 Display |
| 204718C | NEMA 4 Cover Assembly with Reset Button for Mounting S7800 Display | S7800 Display |
| 205321B | Mounting Bracket - Flush Mounting the S7800 Display | S7800 Display |
| 221729A | Dust Cover for 7800 Relay Modules | 7800 Relay Modules |
| 221818A | Display Extension Cable - 60 inches for S7800 Display | S7800 Display |
| 221818C | Display Extension Cable - 10 foot for S7800 Display | S7800 Display |
| 32005580-001 | Cable for connecting Keyboard Display Module (KDM) to CR7890 | CR7890 |
| 32006648-001 | NEMA I Cover for CR7890B | CR7890 |
| 32007181-001 | Wiring Harness with 9-pin Brad HarrisonÆ to CR7890 | CR7890 |
| 208727 | Connector, 8 pin for S7810B, M | S7810B, M |

NOTE: THESE PRODUCTS ARE AVAILABLE ONLY THROUGH AUTHORIZED CONTROLINKS™ REPRESENTATIVES.

ML7999A Universal Parallel-Positioning Actuator



Provides 100 lb-in. torque, pulse-width-modulating (PWM) control of combustion air dampers, butterfly gas valves, oil modulation valves, and flue gas recirculation systems. The actuator includes a precision feedback potentiometer and integral power supply. The ML7999A Actuator is part of the ControlLinks™ Fuel Air Control System, and must be used with the R7999 Fuel Air Controller.

Electrical Ratings:

Power Input: 100 to 240 Vac (+10/-15%), 50/60 Hz; Maximum Power Consumption: 15 VA.

Temperature Rating (Ambient): -40 F to +140 F; -40 C to +60 C.

Temperature Rating (Storage): -40 F to +150 F; -40 C to +65 C.

Humidity Range at 95 F (35 C): 5 to 95% RH, noncondensing.

Vibration: 0.0 to 0.5g continuous (V2 level).

Control Signal (at 5 mA current): Drive Clockwise: Minimum 4.25 Vdc differential between DR1-DR2; Drive Counterclockwise: Maximum -4.25 Vdc differential between DR1-DR2.

NOTE: Actuator does not respond until the 8-digit ID signal from the R7999 is passed via DR1-DR2.

Actuator Stroke: 95° nominal \pm 3°, mechanically limited.

Output Hub Position Accuracy: \pm 0.1°.

Torque Ratings at Rated Voltages: Lift and Hold Minimum: 100 lb-in. (11.3 Nm); Breakaway Minimum: 100 lb-in. (11.3 Nm); Stall Minimum: 100 lb-in. (11.3 Nm); Stall Maximum: 150 lb-in. (17 Nm).

Actuator Design Life (at 100 lb-in.): Full-Stroke Cycles: 100,000 minimum; repositions: 2,000,000 minimum.

Feedback Potentiometer: Total Resistance: 5000 ohms \pm 10%.

- Password protected with an eight-digit hexadecimal identification signal.
- Separate wiring compartment between line voltage power wiring and low voltage control.
- Couples directly to a 1/2 in. (13 mm) shaft with no additional parts required.
- Couples directly to 5/16 in. (8 mm) and 3/8 in. (9 mm) shafts using available self-centering shaft reduction accessories.
- Shaft coupler assembly available for shafts larger than 1/2 in.
- Bracket Accessory Kit available for mounting to Honeywell V51 Butterfly Gas Valves.
- NEMA 2
- IP54 with weatherproof kit (see Accessories)

Actuator Timing (90° Travel): **Standard:** 24 to 30 seconds; Derated Cold-Start Timing (from -40 F to -20 F (-40 C to -29 C), 150 seconds maximum.

Noise Rating: 55 dBA maximum at 1m during normal operation.

Mounting: Mounts directly on 1/2 in. (13 mm) round or square shaft. With proper accessories, mounts to 5/16 in. and 3/8 in. (8 mm, 10 mm) round or square shafts; 9/16 in., 5/8 in., and 3/4 in. (14 mm, 16 mm, and 19 mm) round shafts.

Position Indicator: Visible with cover on device.

Approvals: Underwriters Laboratories Inc. (UL): meets UL873; Canadian Standards Association (CSA); European Community (CE):

Accessories:

201391 Shaft Adapter for 3/8 in. round or square shaft;

32002935-001 ML7999 Weatherproof Kit

32003167-001 Shaft Adapter for 5/16 in. round or square shaft

32003168-001 Shaft Adapter for 3/4 in. diameter round shaft

32003168-002 Shaft Adapter for 5/8 in. diameter round shaft

32003168-003 Shaft Adapter for 9/16 in. diameter round shaft

32003396-001 V51 Mounting Bracket for 1-1/2 in. and 2 in. valves

32003396-002 V51 Mounting Bracket for 2-1/2 in., 3 in. and 4 in. valves.

| Product Number | Description |
|----------------|---|
| ML7999A1003 | Universal Parallel-Positioning Actuator. Medium torque electronic actuator with a precision feedback potentiometer and integral power supply capable of direct line voltage connection. |

ControLinks™ Fuel Air Control System

R7999A ControLinks™ Fuel Air Controller



Uses the latest microprocessor-based technology to simultaneously control up to four actuators. When used with the ML7999 Universal Parallel Positioning Actuators, represents a value-added replacement of mechanical cam and linkage assembly controlling the relationship between fuel, airflow and flue gas recirculation (if used) on a power burner. The ControLinks Fuel Air Control System consists of the R7999 Fuel Air Controller, Q7999 Wiring Subbase, ML7999 Universal Parallel Positioning Actuator and ZM7999 Configuration Software.

Description: Fuel Air Controller, consisting of a four-channel actuator drive Input/Output (I/O) and hardware interface for a variety of burner controllers.

Temperature Rating (Ambient): -40 F to +140 F; -40 C to +60 C.

Temperature Rating (Storage): -40 F to +150 F; -40 C to +65 C.

Humidity Range: 5 to 95% RH, noncondensing.

Electrical Ratings: (Input Power): 100 to 120 Vac (+10/-15%), 50/60 Hz ($\pm 10\%$), 10VA maximum.

The R7999, with one communications port, provides communications capabilities similar to those found in the 7800 SERIES controls.

- Fast burner setup via PC or laptop.
- Fuel, air, FGR profile download capability.
- Two independent fuel profiles with or without FGR.
- 7 to 24 point profiles.
- Programmable behaviors of all actuators during Purge and Standby.
- Programmable behavior of nonselected fuel actuator.
- Independent lightoff and minimum modulation positions.
- Wide power voltage input range (100 to 120 Vac, 50/60 Hz).
- Auto/Manual input.
- Manual mode firing rate input.
- Pluggable controller to wiring subbase.
- Multipurpose communications port.
- Field-configurable device.
- Integrated boiler shock protection algorithms:
- Water temperature low fire hold.
- Stack temperature low fire hold.
- FGR and low fire hold.
- Selectable FGR hold based on stack temperature.
- Programmable behavior of FGR actuator during purge.
- Maximum modulation limit capability.
- Remote reset input.
- Automated actuator endpoint seeking process.
- CSD-1 and NFPA acceptable.

Vibration: 0.0 to 0.5g continuous (V2 level).

Mounting: Mounts on Q7999 Wiring Subbase.

Approvals:

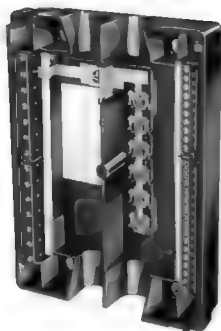
Underwriters Laboratories Inc (UL) : Listed, Report No. MH17367

Accessories:

32002515-001 Three-Pin Electrical Connector.

| Product Number | Description |
|----------------|--|
| R7999A1005 | Fuel Air Ratio Controller, 100 to 120 Vac, 50/60 Hz. |

Q7999A ControLinks™ Fuel Air Control Wiring Subbase



Provides terminals for field wiring for the R7999A ControLinks Fuel Air Controller. Terminals on the R7999A,B Controller engage the Q7999 contacts to make electrical connections.

The Q7999A Subbase is panel-mounted.

- Quick-mount wiring subbase for R7999A,B Fuel Air Ratio Controllers.
- Allows wiring of control system before installation of controller.
- Panel-mounted.
- NEMA 1 enclosure.

Weight: 10 oz; 0.28 kg.

Enclosure: NEMA 1.

Approvals:

Underwriters Laboratories Inc: Listed, Report No. MH17367

| Product Number | Description |
|----------------|--|
| Q7999A1006 | Fuel Air Ratio Controller Wiring Subbase |

ZM7999A ControlLinks™ Fuel Air Control System Configuration Software

The ZM7999 Software Configuration Tool reduces burner setup time by letting you create a burner modulation curve (profile) for the burner that allows for safe and efficient operation at all points along the modulation curve. The software uses a wizard-like process to assist you through the commissioning process. It also lets you save curves in standard PC files so that you can commission similar systems rapidly and safely. Once the burner is commissioned, real-time monitoring of the system can be done via the monitoring tool.

Minimum Hardware Requirements:

- PC or laptop with a Pentium® processor.
- Windows® 95 or Windows 98.
- 16 MB of RAM.
- 1G hard drive with 100 MB of free memory.
- 4X (or higher) CD-ROM drive.
- Mouse.
- Super VGA color monitor (800 x 600 resolution suggested).

| Product Number | Description |
|----------------|------------------------|
| ZM7999A1006 | Configuration Software |

S7999 ControlLinks™ Display Module



The S7999 ControlLinks Display module (DM) provides local or remote annunciation of system operation, fault information, diagnostic information, actuator settings and configuration settings of the ControlLinks system.

- Communication interface capability to the ControlLinks system.
- Dependable, long-term operation provided by microcomputer technology.
- Local or remote system annunciation provided by a 2-row by 20-column display.
- Operating Status:
 - Source of demand/control.
 - Actuator positions.
 - Hold status.
 - Total cycles.
 - Total hours of operation.
 - Run time.
- Fault history of six most recent faults.
 - Fault code.
 - Fault message.
 - Cycles at time of fault.

- Diagnostic information:
 - Input/Output status.
 - Demand/control input and position.
 - Fuel selection.
 - Fuel position.
- Motor settings:
 - Light-off position of fuel, air and FGR.
 - purge position of fuel, air and FGR.
 - Programmed stop position of fuel, air and FGR.
- Configuration settings:
 - Low Fire Hold input (XmA).
 - FGR Purge position.
 - Manual potentiometer limit enabled/disabled.
 - R7999 hardware/software revision.
 - Display Module (DM) software revision.

Dimensions: 4 27/32 in. wide, 2 29/32 in. high, 29/32 in. deep;
123 mm wide, 73 mm high, 23 mm deep.

Electrical Ratings, Power Supply: 13 Vdc peak full wave rectified (+20/-15%).

Humidity Ratings: 85% RH continuous, non-condensing

Vibration: 0.5 G environment

Weight: 4 oz (113 g)

Temperature Rating (Ambient): -40 F to 140 F; -40 C to 60 C.

Approvals,

FCC Emissions: FCC Part 15, Class B, Emissions.

Industrial Risk Insurers: IRI Acceptable.

Underwriters Laboratories, Inc: Component Recognized.

Accessories:

206311 Carrying Case for S7800 Display

| Product Number | Comments | Description |
|----------------|------------------|----------------|
| S7999A1002 | English Language | Display Module |

ControlLinks™ Fuel Air Control System

A7999 ControlLinks™ Portable Combustion Analyzer

The portable Combustion Analyzer (PCA) is a commercial grade, hand held, combustion efficiency analyzer that is designed for continuous (on demand) sampling of light industrial and residential furnaces, appliances, and boilers. The basic instrument is supplied with a probe, instruction manual, batteries, and carrying case.



| Product Number | Description |
|----------------|------------------------------|
| A7999A1003 | Portable Combustion Analyzer |

DSP3548 ControlLinks Configuration Tool Kit

The ControlLinks Configuration tool Kit is an accessory for the commissioning of ControlLinks systems. The tool kit consists of the following:

- Carrying Case
- Configuration Software, ZM7999A1006
- RS232-RS485 converter
- RS232 cable

| Product Number | Description |
|----------------|--|
| DSP3548 | Support tool kit for ControlLinks system commissioning |

R7247; R7248; R7249; R7476 Flame Amplifiers



Solid state plug-in units respond to flame detector signal and indicate presence of flame.

- Use with BC7000; R4140; R4075C,D,E; R4138C,D Flame Safeguard controls and appropriate flame detector and FSP5075A1, FSP5075A3 Flame Amplifier Modules.

Type: Flame Amplifier

Humidity Rating (%RH): 5 to 90% RH

Vibration: 0.5 G continuous

Weight: 8 oz. (227 g)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 140-A-2

Control Safety Devices: Acceptable (CSD-1)

Factory Mutual: Approved: Report No. 24181.01

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCC22

| Product Number | Flame Failure Response Time | Self Checking? | Temperature Rating (Operating Range) | | Use with Flame Sensor | Use with Primary Control | Comments |
|----------------|-----------------------------|--------------------|--------------------------------------|---------------|---|---|---------------|
| | | | (F) | (C) | | | |
| R7247A1005 | 2 to 4 sec | None (standard) | -40 F to 145 F | -40 C to 63 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Green |
| R7247A1021 | 1 sec max | None (standard) | -40 F to 145 F | -40 C to 63 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Green |
| R7247B1003 | 2 to 4 sec | AMPLI-CHECK | -40 F to 150 F | -40 C to 66 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Green |
| R7247C1001 | 2 to 4 sec | Dynamic Self-Check | -40 F to 150 F | -40 C to 66 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012E, F | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Green |
| R7248A1004 | 2 to 4 sec | None (standard) | -40 F to 145 F | -40 C to 63 C | Gas, oil, coal: Infrared (lead sulfide) C7015 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Red |
| R7248B1028 | 2 to 4 sec | AMPLI-CHECK | -40 F to 145 F | -40 C to 63 C | Gas, oil, coal: Infrared (lead sulfide) C7015 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Red |
| R7249A1003 | 2 to 4 sec | None (standard) | -40 F to 145 F | -40 C to 63 C | Gas, oil, coal: Ultraviolet (Minipeeper) C7027, C7035 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Purple |
| R7476A1007 | 2 to 4 sec | None (standard) | -40 F to 150 F | -40 C to 66 C | Gas, oil, coal: Adjustable Sensitivity Ultraviolet Flame Sensor C7076 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Blue |
| R7476A1015 | 2 sec max. | Dynamic Self-Check | -40 F to 150 F | -40 C to 66 C | Gas, oil, coal: Adjustable Sensitivity Ultraviolet Flame Sensor C7076 | R4140, BC7000, R4075C, D, E, R4138C, D, FSP5075 | Color: Blue |

Flame Amplifiers

R7824; R7847; R7848; R7849; R7851; R7861; R7886 Flame Signal Amplifiers



Type: Flame Amplifier

Dimensions, Approximate: 3 9/16 in. wide, 3 3/8 in. high, 7/8 in. deep.
(91 mm wide, 85 mm high, 23 mm deep.)

Humidity Rating (%RH): 85% RH continuous, non-condensing

Vibration: 0.5 G continuous

Weight: 2.5 oz. (71g)

Solid state plug-in amplifiers that respond to flame detector inputs to indicate the presence of flame when used with 7800 SERIES relay modules.

- Flame failure response time of 2.0 or 3.0 seconds.
- Flame signal strength ranges from 0.0 to 5.0 Vdc.
- Plug into 7800 relay module through printed circuit board edge connector keyed for proper orientation.
- Flame signal test jacks to measure amplifier flame signal voltage.
- Color-coded labels identify flame detection type:
- Blue—pulsed rectification.
- Dynamic Self-Check Amplifier test the detectors and all electronic components in the flame detection system; 7800 SERIES relay module locks out on safety shutdown with flame detection system failure.
- Compatible with existing Honeywell flame detectors (order separately).

Approvals:

Canadian Standards Association: Certified: File No. LR95329-3

Factory Mutual: Approved: Report No. J.I.1V9A0.AF

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Flame Failure Response Time | Self Checking? | Temperature Rating (Operating Range) | | Use with Flame Sensor | Use with Primary Control | Comments |
|----------------|-----------------------------|--------------------|--------------------------------------|---------------|--|---------------------------|--------------|
| | | | (F) | (C) | | | |
| R7824C1002 | 3.0 sec | Dynamic Self-Check | -40 F to 140 F | -40 C to 60 C | C7024E, F Flame Detector | RM7824 | Color: Green |
| R7847A1025 | 0.8 sec, 1.0 sec | None (standard) | -40 F to 140 F | -40 C to 60 C | Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 | 7800 SERIES Relay Modules | Color: Green |
| R7847A1033 | 2.0 sec, 3.0 sec | None (standard) | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 | 7800 SERIES Relay Modules | Color: Green |
| R7847A1074 | 0.8 sec, 1.0 sec | None (standard) | -40 F to 140 F | -40 C to 60 C | Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 Leadwire Run >50' | 7800 SERIES Relay Modules | Color: Green |
| R7847A1082 | 2.0 sec, 3.0 sec | None (standard) | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 Leadwire Run >50' | 7800 SERIES Relay Modules | Color: Green |
| R7847B1023 | 0.8 sec, 1.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 | 7800 SERIES Relay Modules | Color: Green |
| R7847B1031 | 2.0 sec, 3.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 | 7800 SERIES Relay Modules | Color: Green |
| R7847B1064 | 0.8 sec, 1.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 Leadwire Run >50' | 7800 SERIES Relay Modules | Color: Green |
| R7847B1072 | 2.0 sec, 3.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7005, C7007, C7008, C7009, Q179 Leadwire Run >50' | 7800 SERIES Relay Modules | Color: Green |
| R7847C1005 | 2.0 sec, 3.0 sec | Dynamic Self-Check | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012E, F | 7800 SERIES Relay Modules | Color: Green |
| R7848A1008 | 2.0 sec, 3.0 sec | None (standard) | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Infrared (lead sulfide) C7015 | 7800 SERIES Relay Modules | Color: Red |

Products are available through authorized Honeywell distributors

Flame Amplifiers

| Product Number | Flame Failure Response Time | Self Checking? | Temperature Rating (Operating Range) | | Use with Flame Sensor | Use with Primary Control | Comments |
|----------------|-----------------------------|--------------------|--------------------------------------|---------------|--|---------------------------|---------------|
| | | | (F) | (C) | | | |
| R7848B1006 | 2.0 sec, 3.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Infrared (lead sulfide) C7015 | 7800 SERIES Relay Modules | Color: Red |
| R7849A1015 | 0.8 sec, 1.0 sec | None (standard) | -40 F to 140 F | -40 C to 60 C | Gas, Oil: Minipeeper C7027A, C7035A, C7044 | 7800 SERIES Relay Modules | Color: Purple |
| R7849A1023 | 2.0 sec, 3.0 sec | None (standard) | -40 F to 140 F | -40 C to 60 C | Gas, Oil: Minipeeper C7027A, C7035A, C7044 | 7800 SERIES Relay Modules | Color: Purple |
| R7849B1013 | 0.8 sec, 1.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas, Oil: Minipeeper C7027A, C7035A, C7044 | 7800 SERIES Relay Modules | Color: Purple |
| R7849B1021 | 2.0 sec, 3.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas, Oil: Minipeeper C7027A, C7035A, C7044 | 7800 SERIES Relay Modules | Color: Purple |
| R7851B1000 | 2.0 sec, 3.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Optical (UV, IR, Visible light) C7927, C7935, C7915, C7962 | 7800 SERIES Relay Modules | Color: White |
| R7851B1018 | 0.8 sec, 1.0 sec | AMPLI-CHECK | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Optical (UV, IR, Visible light) C7927, C7935, C7915, C7962 | 7800 SERIES Relay Modules | Color: White |
| R7851C1008 | 2.0 sec, 3.0 sec | Dynamic Self-Check | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Optical (UV Flame Sensor) C7961E,F | 7800 SERIES Relay Modules | Color: White |
| R7861A1026 | 2.0 sec, 3.0 sec | Dynamic Self-Check | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Ultraviolet Flame Sensor C7061 | 7800 SERIES Relay Modules | Color: Purple |
| R7861A1034 | 0.8 sec, 1.0 sec | Dynamic Self-Check | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Ultraviolet Flame Sensor C7061 | 7800 SERIES Relay Modules | Color: Purple |
| R7886A1001 | 2.0 sec, 3.0 sec | Dynamic Self-Check | -40 F to 140 F | -40 C to 60 C | Gas, oil, coal: Adjustable Sensitivity Ultraviolet Flame Sensor C7076 | 7800 SERIES Relay Modules | Color: Blue |

R7257; R7258; R7259 Flame Safeguard Amplifiers

Solid state, plug-in units allow use of rectification, infrared and ultraviolet flame detections. Use with Q518, Q519 and W688A Flame Safeguard multiburner modules and appropriate flame detector.

Type: Flame Amplifier

Approvals:

Canadian Standards Association: Listed: File No. LR1620-231

| Product Number | Flame Failure Response Time | Self Checking? | Use with Flame Sensor | Use with Primary Control | Comments |
|----------------|-----------------------------|-----------------|--|--------------------------|---------------|
| R7257A1028 | 3.0 sec | None (standard) | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7007, C7005, C7008, C7009, Q179 | Q518, Q519, W688A | Color: Green |
| R7258A1001 | 3.0 sec | None (standard) | Gas, oil, coal: Infrared (lead sulfide) C7015 | Q518, Q519, W688A | Color: Red |
| R7259A1000 | 3.0 sec | None (standard) | Gas, oil, coal: Ultraviolet (Minipeeper) C7027, C7035 | Q518, Q519, W688A | Color: Purple |

Flame Amplifiers

R7289, R7290 Flame Safeguard Amplifiers

Solid state, plug-in units allow use of rectification or ultraviolet flame detection. Use with R4795A,D Flame Safeguard primary controls and appropriate flame detector.

Approvals:

Factory Mutual: Approved: Report No. 19608.1

Underwriters Laboratories, Inc: Listed: File No. 268, Vol 7, Sec. 2

Type: Flame Amplifier

| Product Number | Flame Failure Response Time | Self Checking? | Temperature Rating (Operating Range) | | Use with Flame Sensor | Use with Primary Control | Comments |
|----------------|-----------------------------|-----------------|--------------------------------------|----------------|--|--------------------------|---------------|
| | | | (F) | (C) | | | |
| R7289A1004 | 3.0 sec | None (standard) | -40 F to +125 F | -40 C to +52 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7007, C7005, C7008, C7009, Q179 | R4795A, D | Color: Green |
| R7289A1012 | 0.8 sec | None (standard) | -40 F to +125 F | -40 C to +52 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7007, C7005, C7008, C7009, Q179 | R4795A, D | Color: Green |
| R7289A1020 | 3.0 sec | None (standard) | -40 F to +125 F | -40 C to +52 C | Gas, oil, coal: Ultraviolet Flame Sensor C7012A, C Gas: Rectifying Flame Rods C7004, C7007, C7005, C7008, C7009, Q179 | R4795A, D | Color: Green |
| R7290A1001 | 3.0 sec | None (standard) | -40 F to +125 F | -40 C to +52 C | Gas, oil, coal: Ultraviolet (Minipeeper) C7027, C7035 | R4795A, D | Color: Purple |
| R7290A1019 | 0.8 sec | None (standard) | -40 F to +125 F | -40 C to +52 C | Gas, oil, coal: Ultraviolet (Minipeeper) C7027, C7035 | R4795A, D | Color: Purple |
| R7290A1027 | 3.0 sec | None (standard) | -40 F to +125 F | -40 C to +52 C | Gas, oil, coal: Ultraviolet (Minipeeper) C7027, C7035 | R4795A, D | Color: Purple |

Flame Amplifier Parts

| Product Number | Description | Used With |
|----------------|---------------------------------------|-----------|
| 32005301-001 | T Filter for Rectification Amplifiers | R7847 |

C7007 Flame Rod Holder



Application: Gas fired pilot or gas fired system.

Type: Flame Rod

Dimensions, Approximate: 1 15/16 in. high, 2 3/16 in. diameter, 3 3/16 in. long (49 mm high, 56 mm diameter, 81 mm long)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 140-A-2

Used to apply flame rod in gas-fired system controlled by rectification type flame safeguard control.

- Use with pressurized fire boxes. Hold flame rods firmly over the pilot or burner with a chuck and setscrew arrangement.
- Provide electrical connection through a terminal screw.
- Allow ventilation to cool the unit or to minimize soot deposit through a 1/2 in. NPT tapping.
- Mount easily with sleeve or thread type mounting adapters, and a straight or angle body.

Factory Mutual: Approved: Report No. 24181.03

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Mounting Method | Required Parts | Comments | Used With |
|----------------|------------------------|-----------------|---|--|--|
| C7007A1001 | Terminal screw | 1/2 in. NPT | 102709E (48 in., 1219 mm) 102709D (36 in., 914 mm) 102709C (24 in., 610 mm) 102709B (18 in., 457 mm) 102709A (12 in., 305 mm) | Holder only, order Kanthal flame rod separately. | Flame Amplifiers: R7247A, B, R7847A, B, R7257, R7289 |

C7008 Flame Rod Holder



Application: Gas fired pilot or gas fired system.

Type: Flame Rod

Dimensions, Approximate: Holder: 7/8 in. diameter, 3 3/4 in. long (Holder: 22 mm diameter, 95 mm long)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 140-A-2

Miniature “spark plug” type flame rod holder with threaded base, snap-on cover and Kanthal A-1 Flame Rod.

- Use with Honeywell Flame Safeguard controls requiring rectification-type flame detection.
- Use only with gas.
- Install with or without cover.
- Available with a cover that has a right-angle leadwire take-off.
- Comes in several different lengths and can be cut to exact desired length.
- Uses Rajah electrical connector.

Factory Mutual: Approved: Report No. 24181.03

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Mounting Method | Required Parts | Comments | Used With | Includes |
|----------------|----------------------------|-------------------|---|---|--|------------------|
| C7008A1174 | Rajah electrical connector | 1/4 in. NPT male. | 105478D (24 in., 610 mm) 105478C (18 in., 457 mm) 105478B (12 in., 305 mm) 105478A (6 in., 152 mm) | Straight through pattern, 12 in. insertion. Order Flame Rod Separately | Flame Amplifiers: R7247A, B, R7847A, B, R7257, R7289 | Flame rod holder |
| C7008A1182 | Rajah electrical connector | 1/4 in. NPT male. | 105478D (24 in., 610 mm) 105478C (18 in., 457 mm) 105478B (12 in., 305 mm) 105478A (6 in., 152 mm) | Straight through pattern, 24 in. insertion. Order Flame Rod Separately | Flame Amplifiers: R7247A, B, R7847A, B, R7257, R7289 | Flame rod holder |

Flame Detectors

C7009 Flame Rod Holder



Subminiature “spark plug” type flame rod holder with flame rod.

- Use on industrial flame-retention gas burner nozzles.
- Works with Honeywell Flame Safeguard controls requiring rectification type flame detector.
- Mounts in areas with limited space because flame rod can be cut to desired length.
- Uses Rajah electrical connector.

Application: Gas fired pilot or gas fired system.

Type: Flame Rod

Dimensions, Approximate: (Holder: 10 mm diameter, 60 mm long)

Holder: 3/8 in. diameter, 2 3/8 in. long

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 140-A-2

Factory Mutual: Approved: Report No. 24181.03

Industrial Risk Insurers: Acceptable

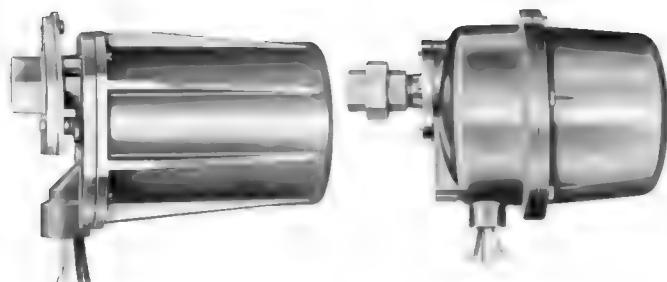
Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Mounting Method | Comments | Used With | Includes |
|----------------|----------------------------|------------------|---------------------------|--|----------------------|
| C7009A1009 | Rajah electrical connector | 1/8 in. NPT male | 4 in. (102 mm) flame rod | Flame Amplifiers: R7247A, B, R7847A, B, R7257, R7289 | Flame rod and holder |
| C7009A1025 | Rajah electrical connector | 1/8 in. NPT male | 12 in. (305 mm) flame rod | Flame Amplifiers: R7247A, B, R7847A, B, R7257, R7289 | Flame rod and holder |

Flame Rod Detector Accessories or Parts

| OS Number | Description | Used With |
|-----------|--|------------------------|
| 102709A | Kanthal Flame Rod - 12 in. | C7004B, C7007A, C7011A |
| 102709B | Kanthal Flame Rod - 18 in. | C7004B, C7007A, C7011A |
| 102709C | Kanthal Flame Rod - 24 in. | C7004B, C7007A, C7011A |
| 102709D | Kanthal Flame Rod - 36 in. | C7004B, C7007A, C7011A |
| 102709E | Kanthal Flame Rod - 48 in. | C7004B, C7007A, C7011A |
| 105465 | Insulator | C7007A |
| 105478A | Kanthal Flame Rod - 6 in. | C7008 |
| 105478B | Kanthal Flame Rod - 12 in. | C7008 |
| 105478C | Kanthal Flame Rod - 18 in. | C7008 |
| 105478D | Kanthal Flame Rod - 24 in. | C7008 |
| 105644A | Kanthal Flame Rod 4 in. includes Electrical Terminal and Washer | C7009A |
| 105644B | Kanthal Flame Rod 8 in. includes Electrical Terminal and Washer | C7009A |
| 105644C | Kanthal Flame Rod 12 in. includes Electrical Terminal and Washer | C7009A |

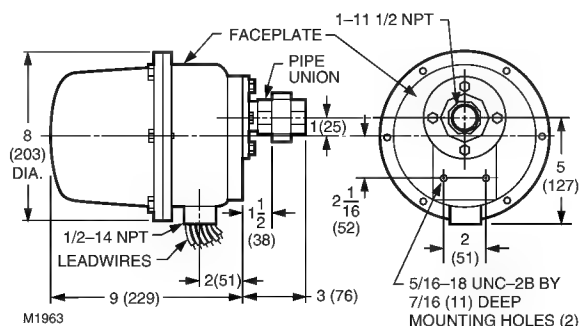
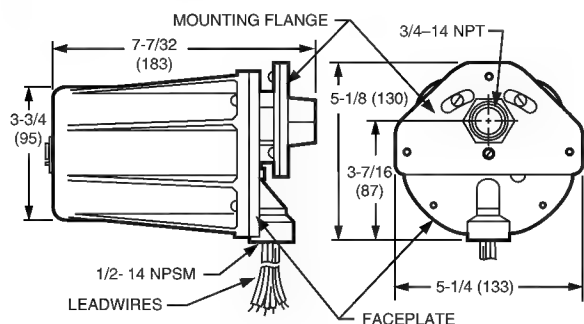
C7012 Solid State Purple Peeper® Ultraviolet Flame Detector



Solid state electronic flame detectors for use with Honeywell Flame Safeguard controls and amplifiers. Sense ultraviolet radiation produced by combustion of gas, oil, coal or other fuels.

- Replace C7012 vacuum tube models.
- Mount horizontally, vertically or at any angle in between.
- Provide quick electrical hookup with threaded conduit fitting and color-coded leadwires.
- Reduced nuisance shutdowns by wiring two in parallel.

Dimension Diagrams



Application: Gas fired burners

Oil fired burners

Coal fired burners

Type: Ultraviolet, Purple Peeper

Dimensions, Approximate: 5 1/4 in. diameter (includes mounting flange), 7 7/32 in. long (133 mm diameter (includes mounting flange), 183 mm long)

Electrical Ratings: 120 Vac

Frequency: 50 Hz, 60 Hz

Ambient Temperature Ratings: 25 F to 175 F (-4 C to 79 C)

Approvals:

Canadian Standards Association: Certified: Master Report LR95329-1

Factory Mutual: Approved: Report No. 14740.01

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | NEMA Rating | Comments | Used With |
|----------------|--------------------------------------|--------------|-------|-----------------|-----------------|---|--|
| | | (inch) | (mm) | | | | |
| C7012A1145 | 4 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012A1152 | 4 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 1 in. NPT | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012A1160 | 4 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 1 in. NPT | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012A1186 | 4 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012A1194 | 4 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012C1042 | 4 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 1 in. NPT | Explosion Proof | Explosion-proof, two piece, violet, cast aluminum enclosure | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012E1104 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1112 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1120 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1146 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1153 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |

Flame Detectors

| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | NEMA Rating | Comments | Used With |
|----------------|--|--------------|-------|-----------------|-----------------|---|--|
| | | (inch) | (mm) | | | | |
| C7012E1161 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1187 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1195 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1203 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012E1278 | Brad Harrison type number 41310 connector | — | — | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012F1052 | 6 NEC Class 1 color-coded leadwires. | 8 ft. | 2.4 m | 1 in. NPT | Explosion Proof | Dynamic self-checking flame detector, explosion-proof, two piece, violet, cast aluminum enclosure | Flame Amplifiers: R7247C, R7847C, R7747C |
| C7012G1019 | 5 lead wires that conform to NEC Class 1. (Additional wire, green/yellow insulation, for ground connection.) | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012G1027 | 5 lead wires that conform to NEC Class 1. (Additional wire, green/yellow insulation, for ground connection.) | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |
| C7012G1035 | 5 lead wires that conform to NEC Class 1. (Additional wire, green/yellow insulation, for ground connection.) | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | For use with rectification flame signal amplifiers | Flame Amplifiers: R7247A, R7847A, R7257 |

C7015 Infrared (Lead Sulfide) Flame Detector



C7015A combination mount and 104662B and D Plug-in Lead Sulfide Cell senses infrared radiation from gas, oil, coal or dual-fuel flames.

- Used for combination or dual-fuel applications.
- Detects pilot and main flame.
- Mounts quickly and easily on a standard 3/4 in. sighting pipe.
- Works where flame rod or rectifying photocell mounts are difficult to apply.
- Includes 110634A Bushing with magnifying lens and 105134-00021 Orifice.
- Uses photoconductive lead sulfide cells 104662B and D.

Application: Used for combination or dual-fuel applications

Type: Infrared (Lead Sulfide)

Dimensions, Approximate: 1 1/4 in. diameter, 2 3/4 in. long (32 mm diameter, 70 mm long)

Ambient Temperature Ratings: 125 F max at sensor (52 C max at sensor)

Approvals:

Canadian Standards Association: Certified: Master Report LR95329-1

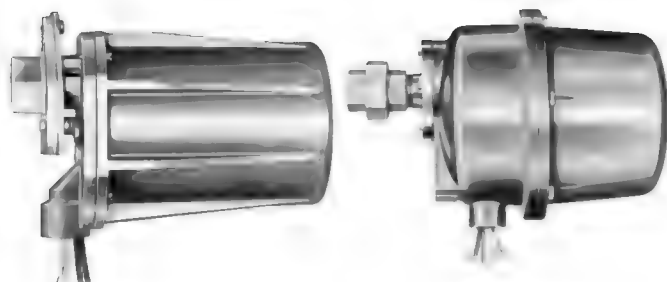
Factory Mutual: Approved: Report No. 24181.03

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | Comments | Used With | Includes |
|----------------|------------------------|--------------|--------|-----------------|--|--|-----------------------------------|
| | | (inch) | (mm) | | | | |
| C7015A1076 | Two no.18 AWG wires | 30 in. | 762 mm | 3/4 in. NPT. | Infrared (Lead Sulfide) Flame Detector | Flame Amplifiers: R7248, R7848, R7748, R7258 | Includes 104662B Sensitivity Cell |
| C7015A1092 | Two no.18 AWG wires | 96 in. | 2.4 m | 3/4 in. NPT. | Infrared (Lead Sulfide) Flame Detector | Flame Amplifiers: R7248, R7848, R7748, R7258 | Includes 104662D Sensitivity Cell |
| C7015A1126 | Two no.18 AWG wires | 48 in. | 1.2 m | 3/4 in. NPT. | Infrared (Lead Sulfide) Flame Detector | Flame Amplifiers: R7248, R7848, R7748, R7258 | 104662D Sensitivity Cell |

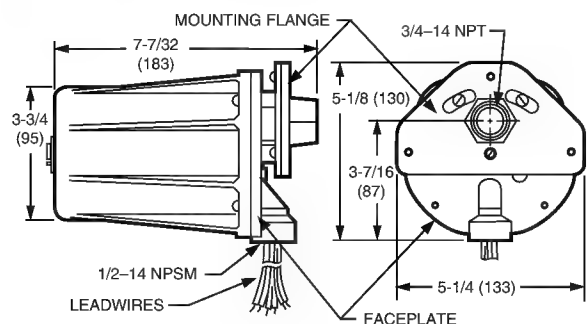
C7024 Solid State Purple Peeper® Ultraviolet Flame Detector



24 Vdc solid state electronic flame detectors for sensing the ultraviolet radiation emitted by the combustion of most carbon containing fuels, such as natural gas, LP gases, and oil.

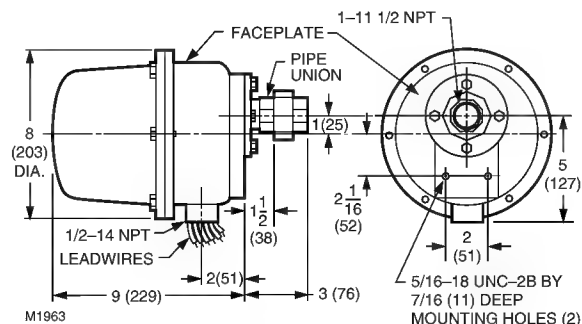
- Use with R7824C Dynamic Self-Check Flame Signal Amplifier.
- Circuitry provides low power consumption and high reliability.
- Mount horizontally, vertically or at any angle in between.
- Field-replaceable UV radiation sensing tube and quartz viewing window.
- Quick electrical installation with threaded conduit fitting and color-coded leadwires.
- Reduce nuisance shutdowns by wiring two in parallel.
- Oscillating shutter interrupts UV radiation 12 times per minute with R7824C.

Dimension Diagrams



C7012A,C,E,F

M1962B



M1963

Application: Gas fired burners

Oil fired burners

Coal fired burners

Type: Ultraviolet, Purple Peeper, Self-Checking

Dimensions, Approximate: 5 1/4 in. diameter (includes mounting flange), 7 7/32 in. long
(133 mm diameter (includes mounting flange), 183 mm long)

Electrical Ratings: 24 Vdc

Ambient Temperature Ratings: -20 F to 175 F (-20 C to 79 C)

Weight: 4.25 (1.9 kg)

Approvals:

Canadian Standards Association: Certified

Underwriters Laboratories, Inc: Component Recognized: File No. MP268

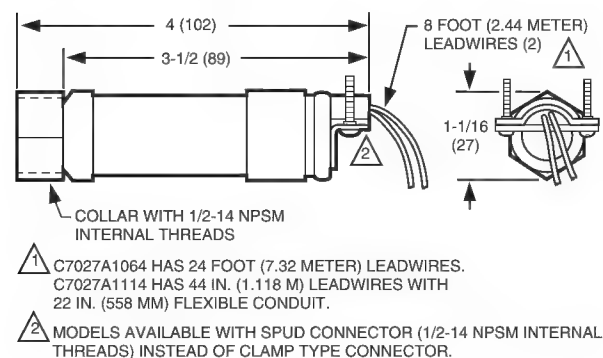
| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | NEMA Rating | Comments | Used With |
|----------------|-------------------------------------|--------------|-------|-----------------|-----------------|--|--------------------------|
| | | (inch) | (mm) | | | | |
| C7024E1001 | Six NEC CLASS 1 color-coded leaders | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Works with 24 Vdc only | Flame Amplifiers: R7824C |
| C7024F1009 | Six NEC CLASS 1 color-coded leaders | 8 ft. | 2.4 m | 1 in. NPT | Explosion Proof | Works with 24 Vdc only, explosion-proof, two piece, violet, cast aluminum. | Flame Amplifiers: R7824C |

Flame Detectors

C7027 Minipeeper Ultraviolet Flame Detector



Dimension Diagrams



C7027

M1943F

Compact Flame Detector for use with flame safeguard controls with ultraviolet amplifiers.

- Use on Honeywell Flame Safeguard primary safety controls and burners requiring ultraviolet flame detection.
- Mounts on a 1/2 in. sighting pipe by using an integral collar.
- Wires in parallel for difficult sighting applications.
- Seals against pressures as high as 5 psi (34.5kPa) when correctly installed.
- Allows for blast tube mounting due to compact size.

Application: Gas fired burners

Oil fired burners

Coal fired burners

Type: Ultraviolet, Minipeeper

Dimensions, Approximate: 1 1/16 in. diameter, 4 in. long
(27 mm diameter, 102 mm long)

Ambient Temperature Ratings: 0 F to 215 F (-18 C to 102 C)

Vibration Rating: 0.5g max

Approvals:

Canadian Standards Association: Certified: Master Report LR95329-1

Factory Mutual: Approved: Report No. 24181.03

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | Comments | Used With | Includes |
|-------------------|--------------------------|--------------|-------|---|---|--|---------------------------------------|
| | | (inch) | (mm) | | | | |
| C7027A1023 | 2 NEC Class 1 leadwires. | 8 ft. | 2.4 m | Integral nut for 1/2 in. sighting pipe. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 | — |
| C7027A1031 | 2 NEC Class 1 leadwires. | 8 ft. | 2.4 m | Integral nut for 1/2 in. sighting pipe. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 | — |
| C7027A1049 | 2 NEC Class 1 leadwires. | 8 ft. | 2.4 m | Integral nut for 1/2 in. sighting pipe. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 | 1/2 in. NPT threaded spud connector. |
| C7027A1056 | 2 NEC Class 1 leadwires. | 8 ft. | 2.4 m | Integral nut for 1/2 in. sighting pipe. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 | — |
| C7027A1064 | 2 NEC Class 1 leadwires. | 24 ft. | 7.3 m | Integral nut for 1/2 in. sighting pipe. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 | 1/2 in. NPT threaded spud connector. |
| C7027A1072 | 2 NEC Class 1 leadwires. | 8 ft. | 2.4 m | Integral nut for 1/2 in. sighting pipe. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 | 1/2 in. NPT threaded spud connector. |
| C7027A1080 | 2 NEC Class 1 leadwires. | 8 ft. | 2.4 m | Integral nut for 1/2 in. sighting pipe. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 | 136733 Heat Block and 390427B bushing |

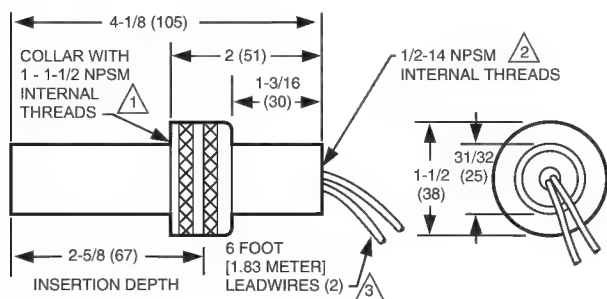
C7035 Minipeeper Ultraviolet Flame Detector



Compact flame detector for use with flame safeguard controls with ultraviolet amplifiers.

- Use on Honeywell Flame Safeguard primary safety controls and burners requiring ultraviolet flame detection.
- Mounts on a 1 in. sighting pipe by using an integral collar.
- Protects the sensing tube with a shield.
- Meets outdoor raintight requirements of Underwriters Laboratories Inc., NEMA 3 and NEMA 4.
- Wires in parallel for difficult sighting applications.
- Seals against pressures as high as 5 psi (34.5 kPa) when correctly installed.
- Field-replaceable ultraviolet sensing tube.

Dimension Diagrams



1 DIN APPROVED C7035A1064 HAS 1-11 BSP.P1 INTERNAL MOUNTING THREADS.

2 DIN APPROVED C7035A1064 HAS 1/2-14 BSP-F INTERNAL MOUNTING THREADS.

3 C7035A1056 HAS 12 FOOT (3.66 METER) LEADWIRES.

C7035

M1945D

Application: Gas fired burners

Oil fired burners

Coal fired burners

Type: Ultraviolet, Minipeeper

Dimensions, Approximate: — (38 mm diameter, 105 mm long)

Ambient Temperature Ratings: 0 F to 250 F (-18 C to 121 C)

Vibration Rating: 0.5g max

Weight: 6 oz (0.17 kg)

Approvals:

Canadian Standards Association: Certified: Master Report LR95329-1

Factory Mutual: Approved: Report No. 24181.03

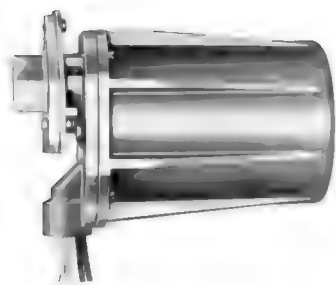
Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Lead Lengths | | Conduit Connection | NEMA Rating | Comments | Used With |
|-------------------|--------------------------|--------------|-------|---|-------------------|---|--|
| | | (inch) | (mm) | | | | |
| C7035A1023 | 2 NEC Class 1 leadwires. | 6 ft. | 1.8 m | Integral nut for 1/2 in. sighting pipe. | NEMA 3 and NEMA 4 | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 |
| C7035A1031 | 2 NEC Class 1 leadwires. | 6 ft. | 1.8 m | Integral nut for 1/2 in. sighting pipe. | NEMA 3 and NEMA 4 | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 |
| C7035A1049 | 2 NEC Class 1 leadwires. | 6 ft. | 1.8 m | Integral nut for 1/2 in. sighting pipe. | NEMA 3 and NEMA 4 | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 |
| C7035A1056 | 2 NEC Class 1 leadwires. | 12 ft | 3.5 m | Integral nut for 1/2 in. sighting pipe. | NEMA 3 and NEMA 4 | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 |
| C7035A1064 | 2 NEC Class 1 leadwires. | 6 ft. | 1.8 m | Integral nut for 1/2 in. sighting pipe. | NEMA 3 and NEMA 4 | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 |
| C7035A1080 | 2 NEC Class 1 leadwires. | 6 ft. | 1.8 m | Integral nut for 1/2 in. sighting pipe. | NEMA 3 and NEMA 4 | Detects ultraviolet radiation in flames | Flame Amplifiers: R7249A, B, R7849A, B, R7749B, R7259, R7290 |

Flame Detectors

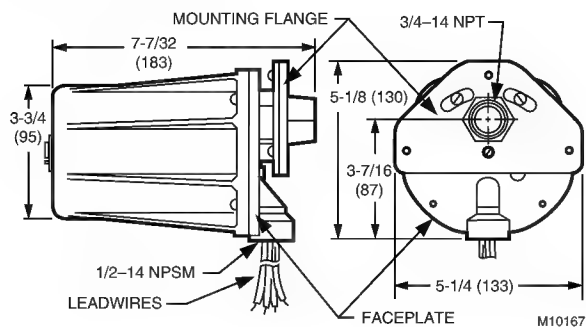
C7061 Dynamic Self-Check Ultraviolet Flame Detector



Dynamic self-checking flame detector used with R7861 Dynamic Self-check Amplifiers for sensing the ultraviolet radiation generated by the combustion of gas, oil, or other fuels.

- Oscillating shutter interrupts ultraviolet radiation reaching the UV sensor 12 times per minute to provide the UV sensor tube checking function. Amplifier circuitry components are checked from the microprocessor in the 7800 SERIES Control.
- Can be mounted horizontally, vertically or at any angle in between. The detector requires faceplate alignment and has integral locating reference points to assure proper operation of the shutter mechanism.
- Field replaceable ultraviolet radiation sensing tube and quartz viewing window.
- Threaded conduit fitting and color-coded leadwires allow rapid electrical installation.
- Two detectors can be wired in parallel to reduce nuisance shutdowns in difficult flame sighting applications.
- Incorporates UV sensor tube checking feature; used with R7861 Dynamic Self-check Amplifiers.
- Housing meets NEMA 4 enclosure standards.
- Protective heat block built into mounting flange.
- Swivel mount is available to facilitate flame sighting.
- -40 F (-40 C) rated ultraviolet sensing tube is available.

Dimension Diagrams



Application: Gas fired burners
Oil fired burners

Type: Ultraviolet, Purple Peeper, Self-Checking

Dimensions, Approximate: 5 1/4 in. diameter (includes mounting flange), 7 7/32 in. long
(133 mm diameter (includes mounting flange), 183 mm long)

Ambient Temperature Ratings: -40 F to 175 F (-40 C to 79 C)

Vibration Rating: —

Weight: 2.6 lb (1.2 kg)

Approvals:

Canadian Standards Association: Certified: Master Report LR95329-1

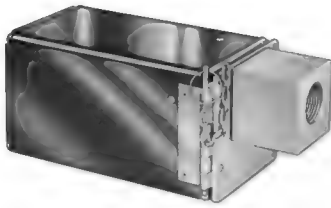
Factory Mutual: Approved: Report No. 14740.01

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | NEMA Rating | Comments | Used With |
|----------------|---|--------------|-------|-----------------|-----------------|--------------------------------------|-------------------------|
| | | (inch) | (mm) | | | | |
| C7061A1012 | Color-coded lead wires | 8 ft. | 2.4 m | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7861 |
| C7061A1038 | Brad Harrison type number 41310 connector | — | — | 3/4 in. NPT. | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7861 |
| C7061A1046 | Brad Harrison type number 41310 connector | — | — | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector | Flame Amplifiers: R7861 |
| C7061F2001 | Color-coded lead wires | 8 ft. | 2.4 m | 1 in. NPT | Explosion Proof | Dynamic self-checking flame detector | Flame Amplifiers: R7861 |

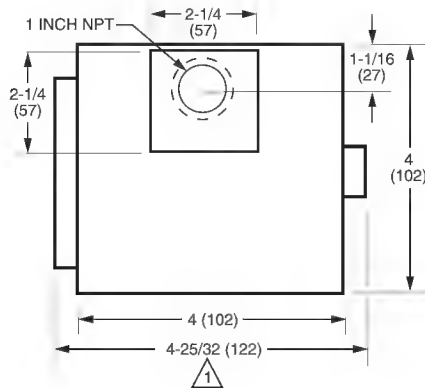
C7076 Ultraviolet Flame Detector



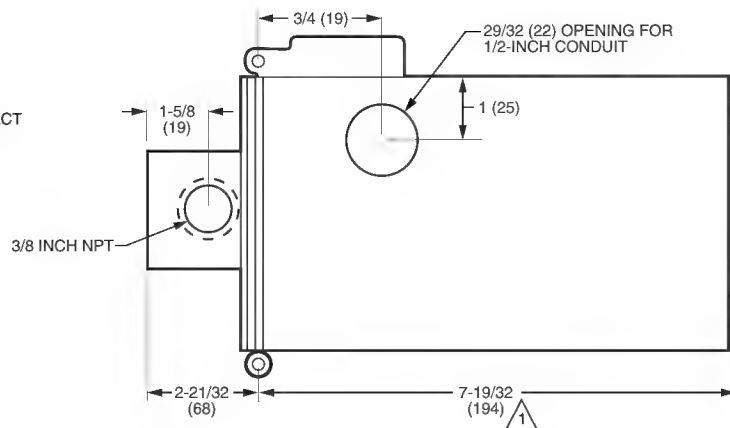
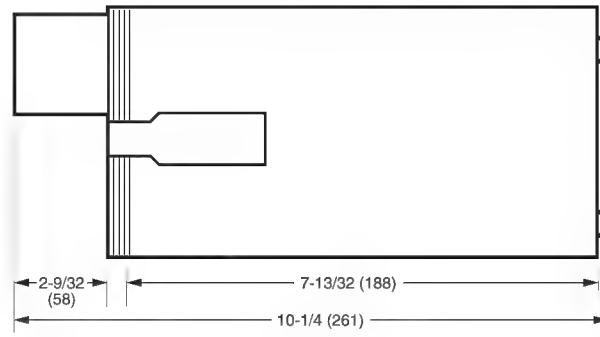
Solid state dynamic self check flame detectors for use with BC7000, R4140 or FSP5075 with R7476 Amplifier and 7800 SERIES with R7886 Amplifier.

- Use Honeywell Flame Safeguard primary safety controls requiring adjustable sensitivity ultraviolet flame detection.
- Detect ultraviolet radiation from flames.
- Include dual sensitivity adjustment.

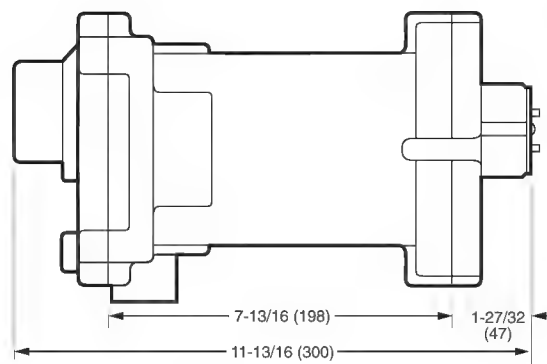
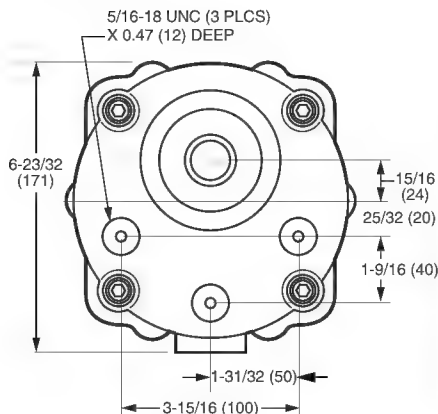
Dimension Diagrams



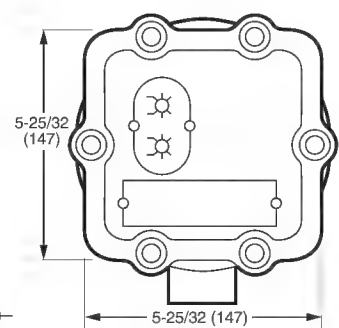
1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.



C7076A



C7076D



M20749A

Flame Detectors

Application: Gas fired burners

Oil fired burners

Type: Ultraviolet, Adjustable Sensitivity

Dimensions, Approximate: 4 in. high, 4 in. wide, 10 1/4 in. deep
(102 mm high, 102 mm wide, 261 mm deep)

Electrical Ratings: 120 Vac

Frequency: 60 Hz

Ambient Temperature Ratings: -40 F to 160 F (-40 C to 71 C)

Vibration Rating: 0.5g max

Approvals:

Canadian Standards Association: Certified: Master Report LR1620

Factory Mutual: Approved: Report No. FM26980

Industrial Risk Insurers: Acceptable

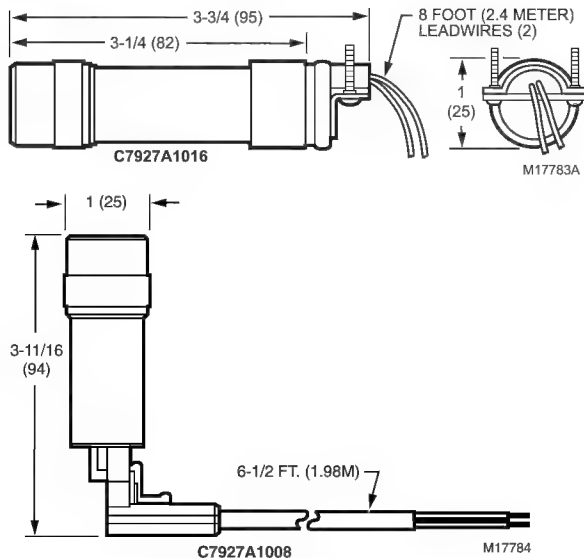
Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

| Product Number | Electrical Connections | Mounting Method | NEMA Rating | Comments | Used With |
|----------------|------------------------|-----------------|-------------|--|--------------------------------|
| C7076A1007 | Terminal block | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector with adjustable sensitivity | Flame Amplifiers: R7476, R7886 |
| C7076A1015 | Terminal block | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector with adjustable sensitivity | Flame Amplifiers: R7476, R7886 |
| C7076A1031 | Terminal block | 1 in. NPT | NEMA 4 | Dynamic self-checking flame detector with adjustable sensitivity | Flame Amplifiers: R7476, R7886 |
| C7076D1027 | Terminal block | 1 in. NPT | NEMA 7 | Dynamic self-checking flame detector with adjustable sensitivity | Flame Amplifiers: R7476, R7886 |
| C7076D1043 | Terminal block | 1 in. NPT | NEMA 7 | Dynamic self-checking flame detector with adjustable sensitivity | Flame Amplifiers: R7476, R7886 |

C7927 Solid State Ultraviolet Flame Detector



Dimension Diagrams



The Solid State Ultraviolet Flame Detectors detect the ultraviolet radiation emitted by combustion flames. The flame detectors are used with Honeywell flame safeguard controls to provide flame supervision for gas, oil, or combination gas-oil burners.

- Properly installed the flame detectors are pressure rated for 5 psi.
- Flame detector is used with only the R7851B Flame Amplifier and the 7800 SERIES controls.
- Has an integral collar threaded (internal 1/2-14 NPSM) for mounting on a one-half inch sight pipe.

Application: Gas, Oil, or combination burners-intermittent operation only (burner cycled at least once each 24 hours).

Type: Ultraviolet, Minipeeper

Dimensions, Approximate: 1 in. diameter, 3 3/4 in. long
(25 mm diameter, 95 mm long)

Ambient Temperature Ratings: -4 F to +140 F (-20 C to 60 C)

Vibration Rating: 0.5g max

Approvals:

Canadian Standards Association: Pending

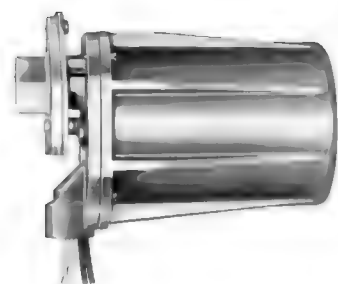
Factory Mutual: Pending

Industrial Risk Insurers: Pending

Underwriters Laboratories, Inc: Component Recognized: File No. MP268

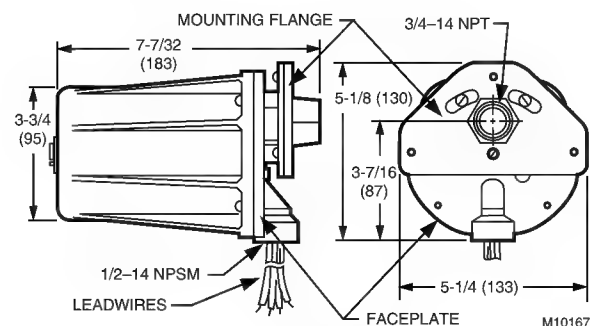
| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | NEMA Rating | Description | Comments | Used With |
|----------------|------------------------|--------------------------------|---------------------------------|--------------------------|-------------|---|---|--------------------------|
| | | (inch) | (mm) | | | | | |
| C7927A1008 | 77 in cable | 77 inch with cable & Connector | 195.6 cm with cable & Connector | 1/2 in NPT pipe mounting | NEMA 1 | Electronic flame detectors that detect ultraviolet radiation in flames. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7851B |
| C7927A1016 | 8 ft leadwires | 8 ft. | 2.4 m | 1/2 in NPT pipe mounting | NEMA 1 | Electronic flame detectors that detect ultraviolet radiation in flames. | Detects ultraviolet radiation in flames | Flame Amplifiers: R7851B |

C7961 Dynamic Self-Check Ultraviolet Flame Detector



The C7961 is a dynamic self-checking flame detector for sensing the ultraviolet radiation generated by the combustion of gas, oil, or other fuels.

Dimension Diagrams



- Oscillating shutter interrupts ultraviolet radiation reaching the UV sensor 12 times per minute to provide the UV sensor checking function. Amplifier circuitry components are checked from the microprocessor in the 7800 Series Control.
- Detectors can be mounted horizontally, vertically or at any other angle. The self-checking model requires faceplate alignment and has integral locating reference points to assure proper shutter mechanism operation.
- Quartz viewing window is field replaceable.
- Threaded conduit fitting and color-coded leadwires allow rapid electrical installation.
- A swivel mount is available to facilitate flame sighting.
- Incorporates UV sensor checking feature; used with R7851C Dynamic Self-checking Amplifier.
- High pressure 50 psi (345 kPa) quartz viewing window, magnifying lens and antivibration mount are available as accessories.
- C7961E housing meets NEMA 4 enclosure standards.
- Protective heat block built into mounting flange.

Application: Gas, Oil or other fuels

Type: Ultraviolet, Self-Checking

Dimensions, Approximate: 3 3/4 in. diameter (5 1/4 in. diameter including mounting flange), 7 7/32 in. long
95 mm diameter (133 mm diameter including mounting flange), 183 mm long)

Electrical Ratings: 120 Vac (-15% +10%)

Frequency: 50 Hz, 60 Hz

Ambient Temperature Ratings: -40 F to +175 F, (-40 C to +80 C)

Weight: 2.6 lb (1.2 kg)

Approvals:

Canadian Standards Association: Certified: Pending

Factory Mutual: Pending

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc. Listed: Pending

| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | NEMA Rating | Includes | Used With |
|----------------|-------------------------|--------------|-------|--|-----------------|--|--------------------------|
| | | (inch) | (mm) | | | | |
| C7961E1006 | NEC Class 1 color-coded | 8 ft. | 2.4 m | Mounting flange with 3/4 inch NPT internal threads for attaching to sight pipe | NEMA 4 | Quartz viewing window rated for 20 psi (138 kPa) | Flame Amplifiers: R7851C |
| C7961F1004 | NEC Class 1 color-coded | 8 ft. | 2.4 m | Mounting flange with 1 inch NPT internal threads for attaching to sight pipe | Explosion Proof | Quartz viewing window rated for 20 psi (138 kPa) | Flame Amplifiers: R7851C |

Flame Detectors

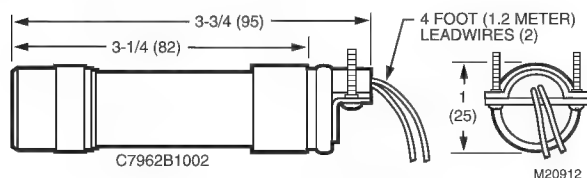
C7962 Visible Light Flame Detector



The C7962B Visible Light Flame Detector detects the visible light emitted by fuel oil combustion flames. The C7962B Detector is used with Honeywell Flame Safeguard controls to provide fuel oil flame supervision in commercial and industrial burners.

- Used with 7800 SERIES Flame Safeguard controls.
- Used with R7851B Flame Amplifier.
- Has an integral collar threaded (internal 1/2-14 NPSM) for mounting on 1/2 inch sight pipe.

Dimension Diagrams



Application: Commercial, industrial oil burners
Type: Visible Light Flame Detector

Dimensions, Approximate: 1 in. diameter, 3 3/4 in. long
(25 mm diameter, 95 mm long)

Ambient Temperature Ratings: -40 F to 160 F (-40 C to 71 C)

-4 F to 140 F (-20 C to 60 C)

Vibration Rating: 0.5g max

Approvals:

Canadian Standards Association: Listed: Report No. 158158-1357526

Underwriters Laboratories, Inc: Component Recognized: File No. MP268, Vol 30.

Accessories:

32007439-001 Mounting Bracket and screws for C7962B

| Product Number | Electrical Connections | Lead Lengths | | Mounting Method | NEMA Rating | Used With |
|----------------|------------------------|--------------|-------|--------------------------|-------------|--------------------------|
| | | (feet) | (mm) | | | |
| C7962B1002 | 8 ft leadwires | 8 ft. | 2.4 m | 1/2 in NPT pipe mounting | NEMA 1 | Flame Amplifiers: R7851B |

Optical Flame Detector Accessories or Parts

| OS Number | Description | Used With |
|--------------|---|---|
| 115330/520 | Vacuum Tube for C7012 | C7012 |
| 120934/520 | Aluminum Flange Gasket for C7012A or C7012E | C7012 |
| 124198 | Mounting Flange for C7012A, C7012C, C7012E, or C7012F | C7012 |
| 105134/0021 | 0.125 in. orifice for 1 in. NPT for C7015 | C7015 |
| 190971G | 24 Vdc Coil and Shutter Assembly for C7024E, F | C7024 |
| 24400152-001 | Quartz lens replacement kit for C7076D consists of quartz lens, gasket, gasket seal | C7076 |
| 102288 | Magnifying Lens for C7003 | C7003 |
| 104662B | Lead Sulfide Cell, with yellow medium sensitivity for C7015 | C7015 |
| 104662D | Lead Sulfide Cell, orange maximum sensitivity range for C7015 | C7015 |
| 105061 | 3/4 in. Heat Block for C7015 | C7015 |
| 105171 | Gasket used in C7015 or C7027 | C7015, C7027 |
| 105172A | Pressure Seal-off Adapter (3/4 NPT) for C7015 | C7015 |
| 105172C | Pressure Seal-off Adapter (3/4 NPT) w/UV Quartz window for C7012, C7024, C7027, C7035, C7061, C7076 | C7012, C7024, C7027, C7035, C7061, C7076 |
| 110412A | Slide Assembly for C7010 | C7010 |
| 110634A | Magnifying Lens Assembly for C7015A | C7015 |
| 113228 | UV Sensing Tube for C7012; C7024 | C7012, C7024 |
| 113236 | Vacuum Tube for C7012 | C7012 |
| 113672A | Seal Off Assembly for C7012, C7024, C7061 | C7012, C7024, C7061 |
| 114372 | Bulk Pack -20 PSI window for C7012E, F; C7024; C7061 | C7012, C7024, C7061 |
| 114465 | Window Gasket for C7012A, E; C7024A; C7061A | C7024, C7061 |
| 114638 | Rubber Washer for C7012A, E; C7024A; C7061A | C7012, C7024, C7061 |
| 115594A | Flange Assembly for C7012C, F; C7024F, C7061F | C7012, C7024, C7061 |
| 117181 | Cork Gasket for C7012A, E; C7024A; C7061A | C7012, C7024, C7061 |
| 118367A | Swivel Mount for C7012, C7015, C7024, C7027, C7035, C7061, C7076 | C7012, C7015, C7024, C7027, C7035, C7061, C7067 |

Flame Detectors

| OS Number | Description | Used With |
|--------------|---|--|
| 120739 | Flange Gasket for C7012, C7024, C7061 | C7024, C7061 |
| 122037 | 100 PSI Quartz Window for C7012C, F; C7061F | C7012C, F; C7061F |
| 122748 | 50 PSI Quartz Window for C7012, C7061 | C7012, C7061 |
| 123539 | Anti-Vibration Mount for C7012, C7024 or C7061 | C7012, C7024, C7061 |
| 124204 | Quartz Magnifying Lens for C7012, C7024 or C7061 | C7012, C7024, C7061 |
| 129464M | UV Power Tube (0 to 250F) for C7035 | C7035 |
| 129464N | UV Power Tube (-40 to 250F) for C7035, C7061 | C7035, C7061 |
| 129685 | Flange Gasket for C7027 | C7027 |
| 129808 | Flange Gasket for C7035 | C7035 |
| 129809 | Mounting Nut for C7035 | C7035 |
| 130716A | Auto Transformer for Vertical Mounting of C7012E, F, C7061A, F | C7012E, F, C7061A, F |
| 133711 | Adapter, 1/2 in. internal to 1/2 in. external for C7015 | C7015 |
| 136733 | Heat Block for C7027 | C7027 |
| 190105 | Water Cooling Jacket for C7012A, F; C7024; C7061 | C7012, C7024, C7061 |
| 190971B | 120 Vac Coil and Shutter Assembly for C7012E, F, C7061A, F | C7012E, F; C7061A, F |
| 190971D | 100 Vac Coil and Shutter Assembly for C7012E, F, C7061A, F | C7012E, F; C7061A, F |
| 190971E | 120 Vac Coil and Shutter Assembly for C7076A, D | C7076A, D |
| 191002B | 120Vac Plug in Electronics less UV Sensing Tube for C7076A | C7076A |
| 191050 | Quartz Viewing Window for C7076 | C7076 |
| 191053 | UV Sensing Tube for C7076 | C7076 |
| 191054 | Housing Gasket for C7076 | C7076 |
| 191284 | Aluminum Shield for C7035 | C7035 |
| 191286 | UV Sensing Tube (-40F) for C7012, C7024 | C7012, C7024 |
| 191702 | Electronics less UV sensing tube for C7012F (120Vac) | C7012F |
| 204341A | UV Mirror Assembly for C7012, C7024, C7027, C7035, C7061, C7076 | C7012, C7024, C7027, C7035, C7061, C7076 |
| 32004080-001 | 120Vac Electronics less UV Sensing Tube for C7012F | C7012F |
| 32004080-002 | 24Vdc Plug in Electronics less UV Sensing Tube for C7024F | C7024F |
| 191002R | 120Vac Plug in Electronics less UV Sensing Tube for C7076D | C7076D |
| 32007439-001 | Mounting Bracket and screws for C7962B | C7962B |
| 190971F | 100 Vac Coil and Shutter Assembly for C7076A, D | C7076 |
| 4074BVK | Mounting Clamp, includes Machine Screw and Nut for C7044 | C7044 |

Hydronic Controllers

W7100J Discharge Water Temperature Controller



A proportional plus derivative (P+D) discharge water temperature control for multistage electric boilers or multiple gas or oil-fired packaged hot water boilers. Provides up to six (6) stages of ON/OFF heating and with W7108B satellite sequencer adds up to four (4) additional ON/OFF heating stages

- Maintain average discharge water temperature for multiple boiler and staged electric boiler applications by staging on and off boilers.
- Provide up to six stages of heating.
- Use C7170 for sensing of water temperature.
- Staged lead/lag function equalizes stage run time, may be disabled for electric boilers.
- Use soft start to minimize boiler rapid cycling during system startup.
- Provides minimum on and off stage timings.
- Uses reset signal from C7031G outdoor air thermistor sensor.
- Provides remote set point capability with use of S963B.

Dimensions, Approximate: 8 5/8 in. high, 6 1/2 in. wide, 3 in. deep
(219 mm high, 165 mm wide, 76 mm deep)

Actuator Motor Speed: Frequency: 60 Hz

Accessories:

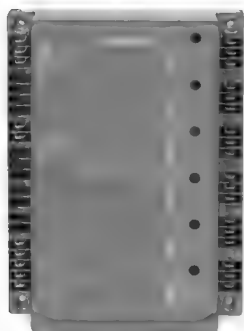
S963B1037 Manual Potentiometer (480 ohm)

S963B1078 Manual Potentiometer (500 ohm)

S963B1128 Manual Potentiometer (135 ohm)

| Product Number | Timing | Electrical Ratings | | | Description |
|----------------|-----------|----------------------|---------------------------|------------------|-------------------------|
| | | Output | Power Consumption Driving | Supply Voltage | |
| W7100J1004 | 2 Minutes | 240 Vac120 Vac24 Vac | 12 VA | 20 Vac to 30 Vac | Discharge Water Control |

W7101A Satellite Sequencer



Provides up to 6 additional stages of heating/cooling control for W7100 Discharge air controller applications

- Extends capacity of W7100 Discharge Air system.
- Advanced microprocessor control algorithm minimizes droop.
- For system with or without economizer.
- Jumper selectable between 4 cool/2 heat or 2 cool/4 heat stages.
- LED's indicate operation of each output stage relay.

Dimensions, Approximate: (6-1/2 inch x 8-1/2 inch x 2-1/4 inch high)

Actuator Motor Speed: Frequency: 60 Hz

| Product Number | Electrical Ratings | Used With |
|----------------|--------------------|-----------|
| | Supply Voltage | |
| W7101A1003 | 20 Vac to 30 Vac | W7100 |

W7101B Discharge Air Controller Satellite Panel

| Product Number | Description | Used With |
|----------------|--|-----------|
| W7101B1001 | Discharge Air Controller Satellite Panel when interfaced with the W7100J, provides additional stages of heat | W7100J |

W964 Aquatrol® Electronic Outdoor Reset Control



Provides reset control of hydronic boilers in commercial applications. Field-selectable on-off or proportional plus integral (P + I) control mode.

- Maintains a steady, comfortable indoor environment by varying the heating water temperature based on outdoor air conditions.
- Provides a 7-day quartz time clock for setback function during unoccupied periods.

Dimensions, Approximate: 5 5/8 in. high, 7 9/16 in. wide, 5 3/4 in. deep (143 mm high, 192 mm wide, 146 mm deep)

Actuator Motor Speed: Frequency: 50/60 Hz

Accessories:

T7160A1004 Space Compensation Sensor for W964F

| Product Number | Electrical Ratings | | Description |
|------------------|--------------------|----------------|--|
| | Output | Supply Voltage | |
| W964F1037 | 120 Vac/24 Vac | 120 Vac | Aquatrol® outdoor reset panel with a 7-day quartz clock and 50 hour battery backup |
| W964F1045 | 120 Vac/24 Vac | 120 Vac | Aquatrol® outdoor reset panel without clock |

Commercial Hydronic Controller Accessories

| OS Number | Description | Used With |
|-------------------|---|------------------------|
| 209918 | 10 red time clock pins used with W964F | W964F |
| 209919 | 10 blue time clock pins used with W964F | W964F |
| 7617ADR | Adapters for T7043A, T7043B and T7044A to connect U.S. conduit fitting to PG-11 thread. | T7043A, T7043B, T7044A |
| 197918 | Tamper Proof Cover for T7160 | T7160 |
| 197942 | 7 Day Quartz Timer for W964F | W964F |
| 4074EDJ | Bag Assembly including Test Plug and Resistors for W7100 | W7100 |
| 4074EFV | Bag Assembly including Resistors for Number of Stages for W7100J | W7100J |
| T7043A1023 | Indoor Immersion Sensor for W964F | W964F |
| T7043B1013 | Outdoor Sensor for W964F | W964F |
| T7044A1014 | Strap on Indoor Sensor for W964F | W964F |
| T7160A1004 | Space Compensation Sensor for W964F | W964F |

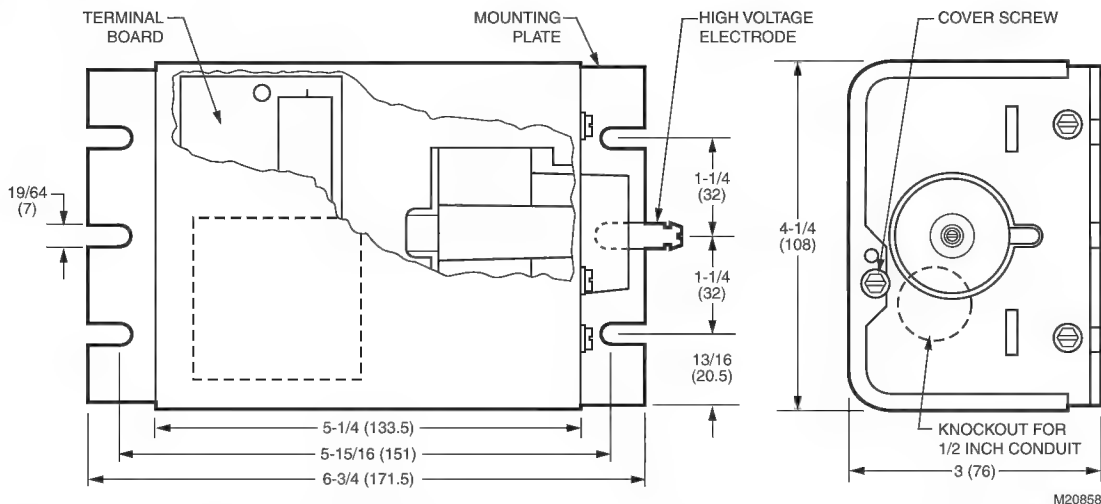
Ignition Transformers

Q624 Solid State Ignition Transformer



- Use to ignite pilots on commercial or industrial gas burners.**
- Ignite gas pilots with spark gaps up to 1/4 in. (6.5 mm).
 - Reliable lightoff with 15,000 peak voltage.
 - Prevent detection of the ignition spark when properly applied in a flame detection system with the C7027, C7035 or C7044 Minipeeper Ultraviolet Flame Detector.
 - For use only in interrupted ignition applications.
 - Mount in same space used by conventional ignition transformer.
 - Light weight, 3 lbs. (1.4 kg) versus 8-1/2 lbs. (3.9 kg) for standard transformers.

Dimension Diagrams



Humidity Range: 95% RH
Ambient Temperature Rating: -40 to +125 F (-40 to + 52 C)
Weight (lb): 3 lbs (1.4 Kg)
Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 140-A-2
Underwriters Laboratories, Inc: Component Recognized

| Product Number | Electrical Ratings | | Description |
|----------------|--------------------|-------------------|--------------------------|
| | Power Supply (Vac) | Power Supply (Hz) | |
| Q624A1014 | 120 | 50 Hz, 60 Hz | Gas Ignition Transformer |

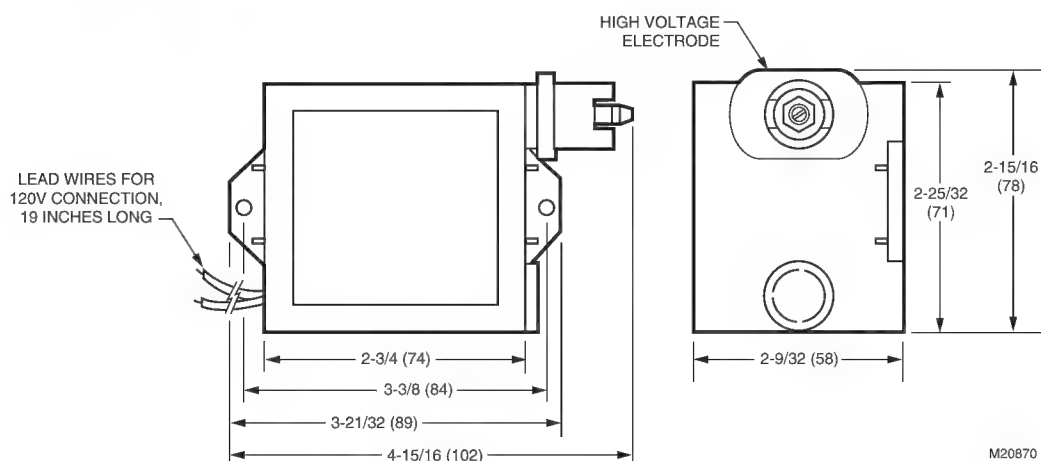
Q652 Solid State Spark Generator



Use to ignite power gas burners in commercial and industrial applications.

- Lightweight, 1 lb. (0.4 kg).
- Include single high voltage electrode for gas applications.
- For use only with interrupted gas pilots with electrode spacings between 0.029 and 0.125 in.
- Mount in same space used by conventional ignition transformer.
- Prevent detection of the ignition spark when properly applied in a flame detection system with the C7027, C7035 or C7044 Minipeeper Ultraviolet Flame Detector.

Dimension Diagrams



Humidity Range: 90% RH
Ambient Temperature Rating: -40 to 113 F (-40 to +45 C)
Weight (lb): 1 lbs (0.4 Kg)
Approvals:

Canadian Standards Association: LA66894
Underwriters Laboratories, Inc: Component Recognized File MH14381

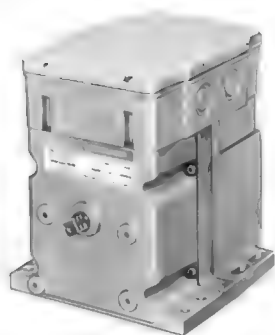
| Product Number | Electrical Ratings | | Description |
|----------------|--------------------|-------------------|--------------------------|
| | Power Supply (Vac) | Power Supply (Hz) | |
| Q652B1006 | 120 | 60 | Gas Ignition Transformer |

Ignition Transformer Accessories or Parts

| OS Number | Description | Used With |
|--------------|---|------------|
| 134666/510 | High voltage terminal insulator for Q652 and Q624 | Q624, Q652 |
| 32004766-003 | Ignition/flame rod cable for Q624 or Q652, priced per foot | Q624 |
| 4074BTN | Bag assembly consisting of washer (103218), cap terminal (135793) and ferrule (37356) for Q624A | Q624 |
| 4074EJP | Screw cap for Q624A (135793) | Q624 |
| 32004766-001 | Ignition Cable Assembly with 24 inch (609 mm) leads | Q624, Q652 |
| 32004766-002 | Ignition Cable Assembly with 120 inch (3048 mm) leads | Q624, Q652 |
| 32004766-004 | Ignition Cable Assembly with 60 inch (1524 mm) leads | Q624, Q652 |

Motors, Firing Rate

M9484D,E,F; M9494D Modutrol® IV Motors



Reversing, proportional motors used to drive burner firing rate valves, dampers or auxiliary equipment. Replace M941A,C,D motors.

- Designed for flame safeguard applications in commercial/industrial oil or gas burner system.
- Vibration resistant electronic drive circuit.
- Regulated by three-wire proportional controller.
- Stroke is field-adjustable to 90 or 160 degrees.

Dimensions, Approximate: 6.45 in. high, 5.50 in. wide, 7.30 in. deep (164 mm high, 140 mm wide, 185 mm deep)

Power Consumption: 18 W

Power Supply: 24 Vac

Crankshaft: double-ended, 3/8 in. (9.5 mm) square

Dead Weight Load On Power Shaft: 200 lb (300 lb combined power and auxiliary shafts)

(90.8 kg (136 kg combined power and auxiliary shafts))

Materials: 200 lb (300 lb combined power and auxiliary shafts)

(90.8 kg (136 kg combined power and auxiliary shafts))

Frequency (Hz): 50/60 Hz

Input Signal: 135 ohm

Switch Ratings (120 Vac): (7.2 AFL, 43.2 ALR, 40 VA pilot duty opposite contact)

Switch Ratings (240 Vac): 3.6 AFL, 21.6 ALR, 40 VA pilot duty opposite contact

Temperature Ratings (ambient): -40 F to 150 F (-40 C to 66 C)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 400-E

Underwriters Laboratories, Inc: Listed: File No. E4436, Guide No. XAPX

| Product Number | Torque, running | Torque, Breakaway | | Timing | | Auxiliary Switch | Auxiliary Switch Setting | Comments |
|----------------|---------------------|-------------------|---------|------------------------|-------------------------|------------------|----------------------------|---|
| | | (lb-in.) | (Nm) | 90 degree stroke (sec) | 160 degree stroke (sec) | | | |
| M9484D1010 | 150 lb-in; 17.0 N m | 300 lb-in. | 34.0 Nm | 30 seconds | 60 seconds | — | — | — |
| M9484E1009 | 75 lb-in; 8.5 N m | 150 lb-in. | 17.0 Nm | 15 seconds | 30 seconds | 1 | 11 degrees | Includes tapped shaft |
| M9484E1017 | 150 lb-in; 17.0 N m | 300 lb-in. | 34.0 Nm | 30 seconds | 60 seconds | 1 | 1 degree | — |
| M9484E1033 | 150 lb-in; 17.0 N m | 300 lb-in. | 34.0 Nm | 30 seconds | 60 seconds | 1 | 4 degrees | Shipped in 90 degree position, includes motor crank arm |
| M9484F1007 | 150 lb-in; 17.0 N m | 300 lb-in. | 34.0 Nm | 30 seconds | 60 seconds | 2 | 5 degrees and 54 degrees | Shipped in 90 degree position |
| M9484F1023 | 75 lb-in; 8.5 N m | 150 lb-in. | 17.0 Nm | 15 seconds | 30 seconds | 2 | — | Includes tapped shaft |
| M9484F1031 | 150 lb-in; 17.0 N m | 300 lb-in. | 34.0 Nm | 30 seconds | 60 seconds | 2 | 5 degrees and 54 degrees | Shipped in 90 degree position, includes tapped shaft |
| M9484F1049 | 150 lb-in; 17.0 N m | 300 lb-in. | 34.0 Nm | 30 seconds | 60 seconds | 2 | 35 degrees and 120 degrees | Shipped in 160 degree position |
| M9494D1000 | 150 lb-in; 17.0 N m | 150 lb-in. | 17.0 Nm | 30 seconds | 60 seconds | — | 54 degrees and 5 degrees | — |

Q100 Butterfly Valve Linkages



Connects V51E valve to M9484 and M9494 Modutrol IV Motors with adapter plate.

- Fits all sizes of V51E Valves
- Mounts easily.

Linkage Type: Butterfly Gas Valve

Mounting: Comments: Use with V51E Gas Valve

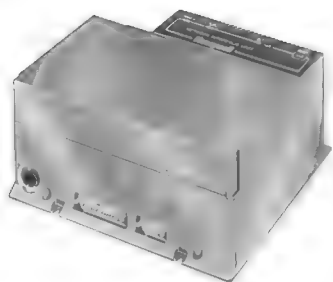
| Product Number | Valve Size Compatibility (in) | Linkage Rod | Use with Actuator | Includes |
|----------------|-------------------------------|-------------|-------------------|-----------------|
| Q100B1006 | all sizes | 10 3/4 in. | Modutrol Motor | — |
| Q100C1021 | 2 1/2 and 3 | 8 1/2 in. | Actionator Motor | Adapter bracket |
| Q100C1039 | 4 | 9 1/8 in. | Actionator Motor | Adapter bracket |

Accessories

| OS Number | Description | Used With |
|-----------|------------------------|-----------|
| 24107 | Swivel joint for Q100B | Q100B |

Network Interface

Q7700 Network Interface Unit



Allows remote monitoring and diagnostics of the BCS 7700 or 7800 SERIES with an IBM®-compatible personal computer.

- Connects with up to six BCS 7700s or 7800 SERIES systems.
- Auto-dialout on BCS 7700 or 7800 SERIES faults up to three telephone numbers.
- Access control, password protection.
- Dialout override for service alarms.
- Internal software clock for date and time stamping of faults.
- Light Emitting Diode (LED) status indication.
- Modular construction. On-line data logging.
- Personal computer interface; user friendly and menu driven.
- Selectable 300 or 1200 baud for ASCII device.
- 9600 baud for local personal computer interface.

Dimensions, Approximate: 9 in wide, 8 in. high, 4 7/8 in deep
(229 mm wide, 203 mm high, 123 mm deep)

Communications: RS485 ControlBus™

Electrical Connections: 25 D pin connector (local), 9 D pin (remote)

Frequency: 50/60 Hz

Humidity Ratings (% RH): operating: 85% RH continuous

Enclosure: NEMA 1

Weight: 4 lbs, 10 oz (2.1 kg)

Temperature Ratings (ambient): 32 F to 130 F (0 C to 54 C)

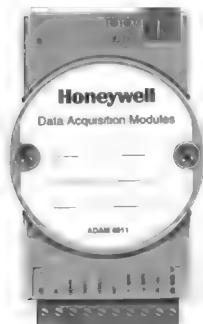
Temperature Ratings (Shipping): -30 F to 150 F (-34 C to + 66 C)

Accessories:

200603 Electrical Connectors a-c for BC7700, ST7700, ST7705

| Product Number | Electrical Ratings (Power Supply) | PC Requirements | Description |
|----------------|-----------------------------------|--|---|
| Q7700A1014 | 120 Vac | 486 DX2 66 MHz IBM® compatible, 16 MB memory, 50 MB available hard disk space, 2X CD-ROM drive, Super VGA color monitor, 3.5 in. diskette drive, serial port for modem, mouse or touch screen, parallel port for printer, printer, keyboard. | Local and remote monitoring and diagnostics |
| Q7700B1004 | 100 to 250 Vac | 486 DX2 66 MHz IBM® compatible, 16 MB memory, 50 MB available hard disk space, 2X CD-ROM drive, Super VGA color monitor, 3.5 in. diskette drive, serial port for modem, mouse or touch screen, parallel port for printer, printer, keyboard. | Local and remote monitoring and diagnostics |

QM4520 Isolated RS-232 to RS-485 Converter Module



Isolated RS-232 to RS-485 Converter Module.

- Accepts RS-232 signal as input (4-wire: TX, RX, RTS, and GND). (Null modem may be required.)
- Outputs RS-485 signal (2-wire).
- Isolation voltage is 500 Vdc.
- Power consumption: 1.2W.
- Mounts on DIN rail, panel or in a 'piggyback' stack.

Dimensions, Approximate: 2 11/32 in. wide, 4 3/32 in. high, 1 3/16 in. deep (60 mm wide, 112 mm high, 30 mm deep)

Communications: RS-485 two wire host; Baud Rates: 1200, 2400, 4800, 9600, and 19200 bps.

Electrical Ratings (Power Supply): Unregulated +10 Vdc to +30 Vdc; protected against power reversal

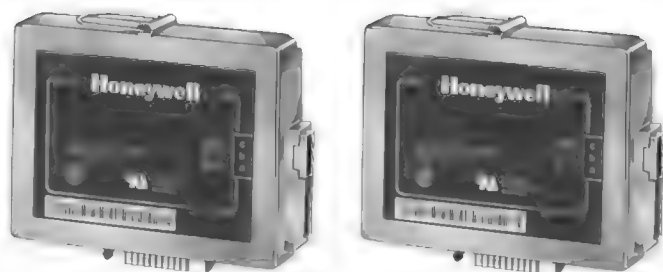
Humidity Ratings (% RH): 5 to 95% RH, non-condensing

Weight: 6 oz (174 g)

Temperature Ratings (ambient): 32 F to 158 F (0 C to +70 C)

| Product Number | Description |
|----------------|----------------------------|
| QM4520A1004 | RS-232 to RS-485 converter |

QS7800A; QS7850 Network Interface ControlBus™ Modules



Allows remote monitoring and diagnostics of the BCS 7700 or 7800 SERIES relay modules.

- Provides local and remote annunciation of 7800 SERIES and BCS 7700 faults.
- Up to six ControlBus™ Modules per Network Interface Unit.
- Modular construction, NEMA 1 rated enclosure.

Dimensions, Approximate: 4 21/32 in. wide, 3 29/32 in. high, 1 in. deep (118 mm wide, 99 mm high, 25 mm deep)

Communications: RS485 ControlBus™

Electrical Ratings (Power Supply): Current Draw: 75 mA

Humidity Ratings (% RH): operating: 85% RH continuous

Enclosure: NEMA 1

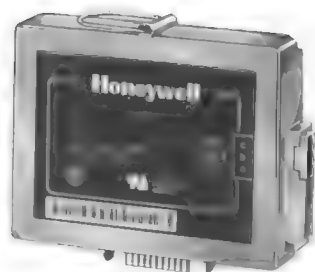
Weight: 8 oz (227 g)

Temperature Ratings (ambient): 32 F to 130 F (0 C to 54 C)

Temperature Ratings (Shipping): -30 F to 150 F (-34 C to + 66 C)

| Product Number | PC Requirements | Description | Includes | Used With |
|----------------|--|--|---|---------------|
| QS7800A1001 | 486 IBM® compatible personal computer and ZM7850A Combustion System Manager Software | Network Interface ControlBus™ Module | 200603 ControlBus™ Three-Prong Electrical Connector | RM7800 Series |
| QS7850A1006 | — | General Purpose Interface ControlBus™ Module | 200603 ControlBus™ Three-Prong Electrical Connector | — |

QS7800B Network Interface ControlBus™ Modules



Allows remote monitoring and diagnostics of multi-dropped 7800 SERIES Relay Modules.

- Up to six ControlBus™ Modules per Network Interface Unit.
- Up to 32 multi-dropped 7800 SERIES subnetworks per module without a RS-485 repeater; up to 61 subnetworks with a repeater.
- Provides local and remote annunciation of 7800 SERIES Relay Module faults.
- Personal computer user interface.
- Modular construction.
- Microsoft Windows™ based Combustion System Manager™ user interface.

Dimensions, Approximate: 4 21/32 in. wide, 3 29/32 in. high, 1 in. deep (118 mm wide, 99 mm high, 25 mm deep)

Communications: RS485 ControlBus™

Electrical Ratings (Power Supply): Current Draw: 75 mA

Frequency: Humidity Ratings (% RH): operating: 85% RH continuous

Enclosure: NEMA 1

Weight: 8 oz (227 g)

Temperature Ratings (ambient): 32 F to 130 F (0 C to 54 C)

Temperature Ratings (Shipping): -30 F to 150 F (-34 C to + 66 C)

| Product Number | PC Requirements | Description | Includes | Used With |
|----------------|--|--------------------------------------|---|--|
| QS7800B1000 | 486 IBM® compatible personal computer and ZM7850A Combustion System Manager Software | Network Interface ControlBus™ Module | 200603 ControlBus™ Three-Prong Electrical Connector | Multi-Dropping 7800 SERIES Relay Modules |

ZM7850 Combustion System Manager™ Software

The ZM7850 Operator Interface Software is used to monitor BCS7700 and 7800 SERIES with a personal computer running Microsoft Windows® 3.0 or higher.

- Dynamic graphical monitoring.

- Virtual face plates that simulate burner or boiler face plates.
- Historical and live trending or points.
- Automatic fault annunciation.
- Automatic time-of-day report generation.

| Product Number | PC Requirements | Description | Used With |
|----------------|--|------------------------------------|-------------------------|
| ZM7850A1001 | 486 IBM® compatible personal computer, DOS 5.0 or later; Windows™ 3.1, 95, or 98, 8 MB RAM and 80 MB available hard disc space | Combustion System Manager Software | BCS7700 and 7800 SERIES |

Network Interface

Network Interface Accessories

| OS Number | Description |
|-------------|---|
| 206610A | Accessory Disk for QS7850 |
| 209162 | Power Supply for Din Rail Mounting - 110V |
| 209163 | Power Supply for Din Rail Mounting - 220V |
| 209164 | Power Supply for Din Rail Mounting - 120/240V |
| 221769 | Barrier to Cover Wiring for Q7800A, B |
| 221237/1698 | Cover assembly-base unit for Q7700A |

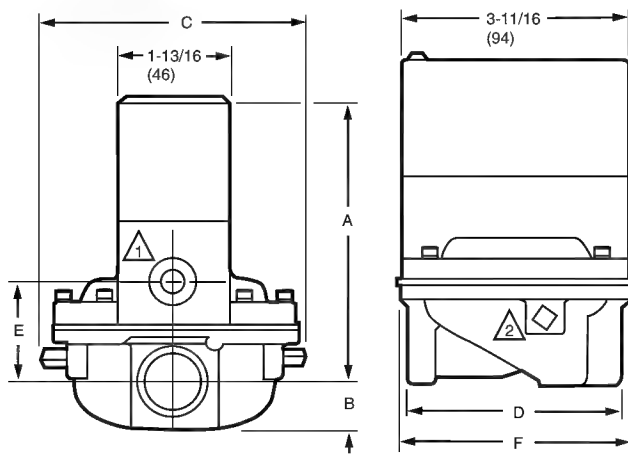
V48A; V88A Diaphragm Gas Valves



Solenoid-operated diaphragm valves provide slow opening and fast closing for controlling fuel gases.

- Close firmly with diaphragm that is both weight and spring loaded.
- Close on power failure; recommended for final shutoff service.
- Set opening time with various sized bleed orifices or adjustable bleed valve.
- Use with LP, natural or manufactured gases.
- Made with cast aluminum in straight-through valve pattern.
- Optional valve position indicator available for 1-1/4 in. and larger valves.

Dimension Diagrams



1 BLEED TAPPING: 1/8-27 NPT, OR 1/8-28 BSP. PL.

2 PILOT TAPING (2): 1/8-27 NPT FOR 3/4 THROUGH 1-1/2 IN. SIZES, 1/4-18 NPT FOR 2 THROUGH 3 IN. SIZES; OR 1/8-28 BSP. PL FOR 1 THROUGH 1-1/2 IN. SIZES, 1/4-19 BSP. PL FOR 2 THROUGH 3 IN. SIZES.

| VALVE SIZE (IN.) | APPROXIMATE DIMENSIONS | | | | | | | | | | | |
|------------------|------------------------|-------|-------|------|-------|-------|---------|-------|--------|------|---------|-------|
| | A | | B | | C | | D | | E | | F | |
| | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM |
| 3/4 | 4-11/16 | 119.1 | 3/4 | 19.1 | 4-5/8 | 117.5 | 3-1/2 | 88.9 | 1-5/8 | 41.3 | 3-13/16 | 96.8 |
| 1 | 5-1/16 | 128.6 | 1 | 25.4 | 5 | 127.0 | 3-11/16 | 93.7 | 2-1/16 | 52.4 | 4-5/16 | 109.5 |
| 1-1/4 | 5-9/16 | 141.3 | 1-1/4 | 31.8 | 5-7/8 | 149.2 | 5-5/16 | 134.9 | 2-3/8 | 60.3 | 5-5/16 | 134.9 |
| 1-1/2 | 5-9/16 | 141.3 | 1-1/4 | 31.8 | 5-7/8 | 149.2 | 5-5/16 | 134.9 | 2-3/8 | 60.3 | 5-5/16 | 134.9 |
| 2 | 6-15/16 | 176.2 | 2-1/4 | 57.2 | 9-1/2 | 241.3 | 8-3/8 | 212.7 | 3-9/16 | 90.5 | 5-5/16 | 236.5 |
| 2-1/2 | 6-15/16 | 176.2 | 2-1/4 | 57.2 | 9-1/2 | 241.3 | 8-3/8 | 212.7 | 3-9/16 | 90.5 | 5-5/16 | 236.5 |
| 3 | 6-15/16 | 176.2 | 2-1/4 | 57.2 | 9-1/2 | 241.3 | 8-3/8 | 212.7 | 3-9/16 | 90.5 | 5-5/16 | 236.5 |

M8487

Body Material: Aluminum

Electrical Terminations: 6 in. Leadwires

Frequency: 60 Hz

Ground terminal: Yes

Mounting Type: Upright (horizontal)

Temperature Ratings: 32 F to 125 F (0 C to 52 C)

Pressure Ratings: 1/2 psi (3.4 kPa)

Pilot Tapping: 1/8-27 NPT

Power Consumption: 9 W, 15 VA max

Valve pattern: Straight-through

Approvals:

Canadian Standards Association: Certificate No. 158158-2500005576 (Z21.21-CSA 6.5)

Underwriters Laboratories, Inc: File No. MH1639, Guide No. YIOZ

Capacity:

| Pipe size (in.) | AGA Certified 1.0 in. pd Natural Gas cfh | m ³ /hr |
|-----------------|--|--------------------------|
| 3/4 in. | 668 cfh | 18.9 m ³ /hr |
| 1 in. | 1021 cfh | 28.9 m ³ /hr |
| 1 1/4 in. | 2100 cfh | 59.5 m ³ /hr |
| 1 1/2 in. | 2400 cfh | 67.9 m ³ /hr |
| 2 in. | 4178 cfh | 118.3 m ³ /hr |
| 2 1/2 in. | 5100 cfh | 144.4 m ³ /hr |
| 3 in. | 5562 cfh | 157.5 m ³ /hr |

Current (max amps at rated Vac/Hz):

| | |
|------|-----------|
| V48A | 0.12 amps |
| V88A | 0.62 amps |

Replacement Parts:

See chart on page 77

| Product Number | Pipe size (in.) | Type of Gas | Bleed Tapping | Power Supply (Vac) | Valve Closing Time | Valve Opening Time | Replacement Parts | Comments |
|----------------|-----------------|------------------------------|---------------|--------------------|--------------------|--------------------|-------------------|----------|
| V48A2151 | 3/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | — |
| V48A2169 | 1 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | — |
| V48A2177 | 1 1/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | — |
| V48A2185 | 1 1/2 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | — |

Diaphragm Gas Valves

| Product Number | Pipe size (in.) | Type of Gas | Bleed Tapping | Power Supply (Vac) | Valve Closing Time | Valve Opening Time | Replacement Parts | Comments |
|----------------|-----------------|------------------------------|---------------|--------------------|--------------------|--------------------|-------------------|-----------------------------|
| V48A2227 | 1 1/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | Includes position indicator |
| V48A2243 | 2 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 2 sec max | 5 sec max | 116931 Coil | — |
| V48A2250 | 2 1/2 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 2 sec max | 5 sec max | 116931 Coil | — |
| V48A2268 | 3 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 2 sec max | 5 sec max | 116931 Coil | — |
| V48A2276 | 1 1/2 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | — |
| V48A2334 | 1 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | — |
| V48A2342 | 1 1/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 1 sec max | 5 sec max | 116931 Coil | — |
| V88A1618 | 1 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1626 | 1 1/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1634 | 1 1/2 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1659 | 3/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1667 | 3/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1675 | 1 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1683 | 1 1/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1691 | 1 1/2 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 116930 Coil | — |
| V88A1709 | 2 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 2 sec max | 5 sec max | 116930 Coil | — |
| V88A1717 | 2 1/2 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 2 sec max | 5 sec max | 116930 Coil | — |
| V88A1725 | 3 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 2 sec max | 5 sec max | 116930 Coil | — |

V48F Diaphragm Gas Valves



Dimension Diagrams
See diagram on page 71

Body Material: Aluminum
Electrical Terminations: 6 in. Leadwires
Frequency: 60 Hz
Ground terminal: Yes
Mounting Type: Upright (horizontal)
Temperature Ratings: 32 F to 125 F (0 C to 52 C)
Pressure Ratings: 5 psi (34.5 kPa)
Pilot Tapping: 1/4-18 NPT
Power Consumption: 9 W, 15 VA max
Valve pattern: Straight-through
Approvals:
Canadian Standards Association: Certificate No. 158158-2500005576 (Z21.21-CSA 6.5)

Solenoid-operated diaphragm valves provide slow opening and fast closing for controlling fuel gases.

- Close firmly with diaphragm that is both weight and spring loaded.
- Close on power failure; recommended for final shutoff service.
- Set opening time with various sized bleed orifices or adjustable bleed valve.
- Use with LP, natural or manufactured gases.
- Made with cast aluminum in straight-through valve pattern.
- Optional valve position indicator available for 1-1/4 in. and larger valves.

Underwriters Laboratories, Inc: File No. MH1639, Guide No. YIOZ

Capacity:

| AGA Certified 1.0 in. pd Natural Gas cfh | m ³ /hr |
|--|--------------------------|
| 4178 cfh | 118.3 m ³ /hr |

Current (max amps at rated Vac/Hz):

| |
|-----------|
| 0.12 amps |
|-----------|

Accessories:

See chart on page 77

| Product Number | Pipe size (in.) | Type of Gas | Bleed Tapping | Power Supply (Vac) | Valve Closing Time | Valve Opening Time |
|----------------|-----------------|------------------------------|---------------|--------------------|--------------------|--------------------|
| V48F1103 | 2 in. | LP, natural, or manufactured | 1/8-27 NPT | 120 Vac | 2 sec max | 5 sec max |

Diaphragm Gas Valves

V48J; V88J High Temperature Diaphragm Gas Valves



Solenoid-operated diaphragm valves provide slow opening and fast closing for controlling fuel gases.

- Close firmly with diaphragm that is both weight and spring loaded.
- Close on power failure; recommended for final shutoff service.
- Set opening time with various sized bleed orifices or adjustable bleed valve.
- Use with LP, natural or manufactured gases.
- Made with cast aluminum in straight-through valve pattern.
- Optional valve position indicator available for 1-1/4 in. and larger valves.

Dimension Diagrams

See diagram on page 71

Body Material: Aluminum

Electrical Terminations: 6 in. Leadwires

Frequency: 50 Hz, 60 Hz

Ground terminal: Yes

Mounting Type: Upright (horizontal)

Temperature Ratings: 32 F to 150 F (0 C to 66 C)

Pressure Ratings: 1/2 psi (3.4 kPa)

Pilot Tapping: 1/8-27 NPT

Power Consumption: 15 VA max, 9 W

Valve pattern: Straight-through

Approvals:

Canadian Standards Association: Certificate No.

158158-2500005576 (Z21.21-CSA 6.5)

Underwriters Laboratories, Inc: File No. MH1639, Guide No. YIOZ

Capacity:

| | AGA Certified 1.0 in. pd Natural Gas cfh | m ³ /hr |
|-----------|---|--------------------------|
| 3/4 in. | 668 cfh | 18.9 m ³ /hr |
| 1 in. | 1021 cfh | 28.9 m ³ /hr |
| 1 1/4 in. | 2100 cfh | 59.5 m ³ /hr |
| 1 1/2 in. | 2400 cfh | 67.9 m ³ /hr |
| 2 in. | 4178 cfh | 118.3 m ³ /hr |

Current (max amps at rated Vac/Hz):

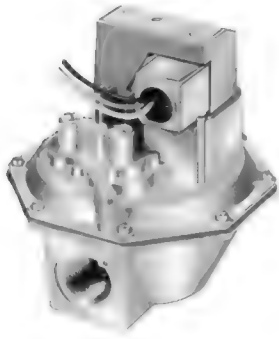
| | |
|-------------|----------------------|
| V48J | 0.13 amps, 0.10 amps |
| V88J | 0.62 amps |

Accessories:

See chart on page 77

| Product Number | Pipe size (in.) | Type of Gas | Bleed Tapping | Power Supply (Vac) | Valve Closing Time | Valve Opening Time | Replacement Parts |
|----------------|-----------------|------------------------------|---------------|--------------------|--------------------|--------------------|-------------------|
| V48J1005 | 3/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 110 Vac, 120 Vac | 1 sec max | 5 sec max | 139937 Coil |
| V48J1013 | 1 in. | LP, natural, or manufactured | 1/8-27 NPT | 110 Vac, 120 Vac | 1 sec max | 5 sec max | 139937 Coil |
| V48J1021 | 1 1/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 110 Vac, 120 Vac | 1 sec max | 5 sec max | 139937 Coil |
| V48J1039 | 1 1/2 in. | LP, natural, or manufactured | 1/8-27 NPT | 110 Vac, 120 Vac | 1 sec max | 5 sec max | 139937 Coil |
| V48J1047 | 2 in. | LP, natural, or manufactured | 1/8-27 NPT | 110 Vac, 120 Vac | 2 sec max | 5 sec max | 139937 Coil |
| V88J1006 | 1 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 118888 Coil |
| V88J1022 | 1 1/4 in. | LP, natural, or manufactured | 1/8-27 NPT | 24 Vac | 1 sec max | 5 sec max | 118888 Coil |

V4943; V4944; V8943; V8944 Diaphragm Gas Valves



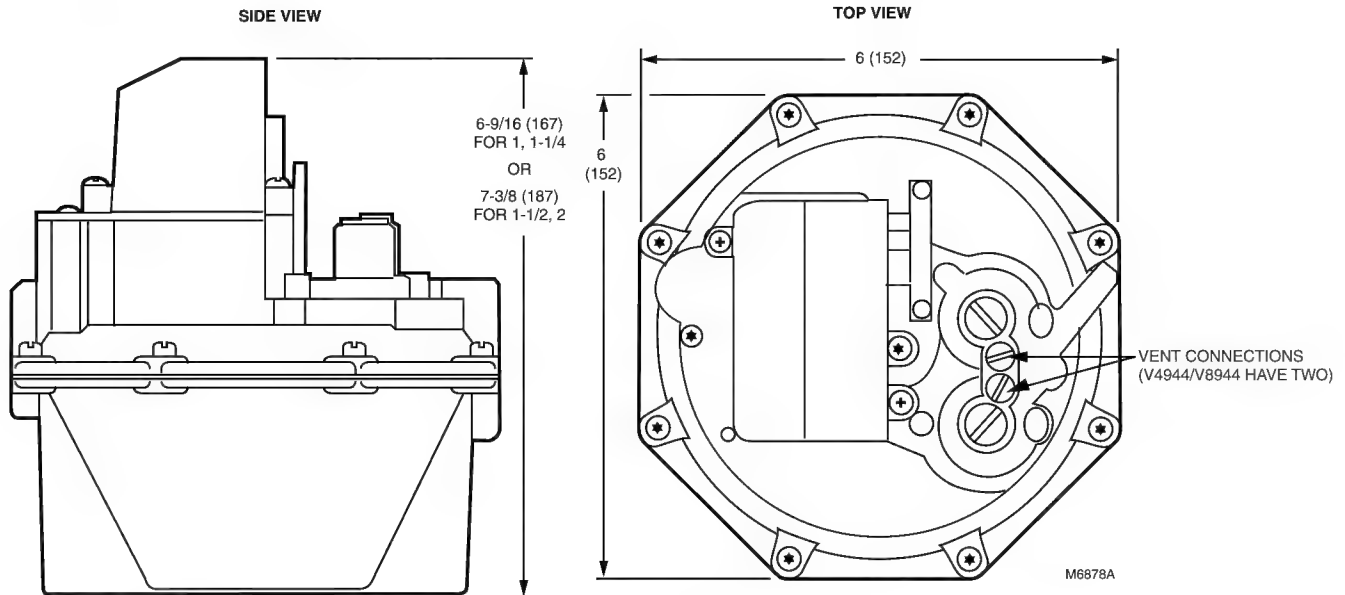
V4943/V8943A On-Off Diaphragm Gas Valves.

V4943/V8943B,C,N Single Stage Pressure Regulating Diaphragm Gas Valves.

V4944/V8944B,C,L,N Two-stage Pressure Regulating Diaphragm Gas Valves.

- Designed as replacement for V4843/V8843; V4844/V8844 Gas Valves.
- Suitable for use on atmospheric boilers, commercial water heaters, and rooftop heaters.
- V4943/V8943A models are solenoid-operated diaphragm valves for on-off flow control of fuel gases.
- V4943/V8943B,C,N and V4944/V8944B,C,L,N models are solenoid-operated diaphragm valves that combine the functions of safety shutoff and pressure regulation in a single unit.
- V4943/V8943B,N and V4944/V8944B,N are for use with natural gas.
- V4943/V8943C and V4944/V8944C,L are for use with LP gas.
- Valve body of die-cast aluminum with a straight-through pattern.
- V4943 are used with line voltage, two-wire thermostats or controllers; V8943 are used with 24 Vac thermostats or controllers.
- V4944 are used with line voltage, dual-stage thermostats or controllers; V8944 are used with 24 Vac dual-stage thermostats or controllers.
- Valve closes on power failure; recommended for final shutoff service.

Dimension Diagrams



Body Material: Aluminum

Electrical Terminations: 1/4 in. (6 mm) spade terminals (quick-connects). 30 in. (762 mm) leadwires and cover for electrical conduit connection provided.

Frequency: 60 Hz

Ground terminal: —

Mounting Type: Upright (horizontal)

Temperature Ratings: -40 F to 150 F (-40 C to 66 C)

Pressure Ratings: 1/2 psi (3.4 kPa)

Pilot Tapping: 1/8-27 NPT

Power Consumption: 6.6 VA

Valve pattern: Straight-through, non-offset

Approvals:

Canadian Standards Association: Certificate No. 158158-1042930, Guide No. 3371-03, 83 (Z21.21, Z21.78)

Underwriters Laboratories, Inc: File No. MH1639, Guide No. YIOZ (60 Hz only)

Regulator Setpoints:

| Type of Gas | Adjustable Range | | Factory Setting | |
|-------------|--------------------------|---------------------------|-----------------|-------------|
| | Low Fire | High Fire | Low Fire | High Fire |
| LP | 1.4 in. wc to 4.2 in. wc | 8.8 in. wc to 11.5 in. wc | 1.4 in. wc | 10.0 in. wc |
| Natural | 0.8 in. wc to 2 in. wc | 3 in. wc to 4.5 in. wc | 0.8 in. wc | 3.5 in. wc |

Capacity:

| Pipe size (in.) | AGA Certified 1.0 in. pd Natural Gas cfh | m ³ /hr |
|-----------------|--|--|
| 1 1/2 in. | 780 cfh to 2300 cfh | 22 m ³ /hr to 65 m ³ /hr |
| 1 1/4 in. | 480 cfh to 1600 cfh | 13.6 m ³ /hr to 45.3 m ³ /hr |
| 1 in. | 300 cfh to 1000 cfh | 8.5 m ³ /hr to 28.3 m ³ /hr |
| 2 in. | 870 cfh to 3000 cfh | 24.6 m ³ /hr to 84.9 m ³ /hr |

Diaphragm Gas Valves

Current (max amps at rated Vac/Hz):

| | |
|-------|------------|
| V4943 | 0.055 amps |
| V4944 | 0.077 amps |
| V8943 | 0.33 amps |
| V8944 | 0.5 amps |

Accessories:

See chart on page 77

| Product Number | Pipe size (in.) | Type of Gas | Bleed Tapping | Power Supply (Vac) | Valve Closing Time | Valve Opening Time | Valve Type |
|----------------|-----------------|----------------|-----------------|--------------------|--------------------|--------------------|-----------------------------|
| V4943A1011 | 1 in. | natural and LP | Internal Bleed | 120 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V4943B1019 | 1 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V4943N1012 | 1 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V4944B1018 | 1 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V4944B1059 | 1 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V4944L1016 | 1 in. | LP | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V4944N1011 | 1 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V4944N1052 | 1 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V8943A1012 | 1 in. | natural and LP | Internal Bleed | 24 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V8943B1010 | 1 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V8943C1018 | 1 in. | LP | 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V8943N1013 | 1 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V8944B1019 | 1 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V8944C1017 | 1 in. | LP | Two 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V8944L1017 | 1 in. | LP | Two 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V8944N1012 | 1 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V4943A1029 | 1 1/4 in. | natural and LP | Internal Bleed | 120 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V4943B1027 | 1 1/4 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V4943N1020 | 1 1/4 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V4944B1026 | 1 1/4 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V4944L1024 | 1 1/4 in. | LP | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V4944N1029 | 1 1/4 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V4944N1060 | 1 1/4 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V8943A1020 | 1 1/4 in. | natural and LP | Internal Bleed | 24 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V8943B1028 | 1 1/4 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V8943C1026 | 1 1/4 in. | LP | 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V8943N1021 | 1 1/4 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V8944B1027 | 1 1/4 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V8944C1025 | 1 1/4 in. | LP | Two 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V8944L1025 | 1 1/4 in. | LP | Two 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V8944N1020 | 1 1/4 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V4943A1037 | 1 1/2 in. | natural and LP | Internal Bleed | 120 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V4943B1035 | 1 1/2 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V4943N1038 | 1 1/2 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V4944B1034 | 1 1/2 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V4944N1037 | 1 1/2 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V8943A1038 | 1 1/2 in. | natural and LP | Internal Bleed | 24 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V8943B1036 | 1 1/2 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V8943N1039 | 1 1/2 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V8944B1035 | 1 1/2 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V8944C1033 | 1 1/2 in. | LP | Two 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V8944N1038 | 1 1/2 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V4943A1045 | 2 in. | natural and LP | Internal Bleed | 120 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V4943B1043 | 2 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |

Products are available through authorized Honeywell distributors

Diaphragm Gas Valves

| Product Number | Pipe size (in.) | Type of Gas | Bleed Tapping | Power Supply (Vac) | Valve Closing Time | Valve Opening Time | Valve Type |
|----------------|-----------------|----------------|-----------------|--------------------|--------------------|--------------------|-----------------------------|
| V4943N1046 | 2 in. | Natural | 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V4944B1042 | 2 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V4944N1045 | 2 in. | Natural | Two 5/16-24 UNF | 120 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |
| V8943A1046 | 2 in. | natural and LP | Internal Bleed | 24 Vac | 3 sec max | 6 sec max | On-Off, Rapid Opening |
| V8943B1044 | 2 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Single-Stage, Slow Opening |
| V8943N1047 | 2 in. | Natural | 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Single-Stage, Rapid Opening |
| V8944B1043 | 2 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 3 sec to 25 sec | Two-Stage, Slow Opening |
| V8944N1046 | 2 in. | Natural | Two 5/16-24 UNF | 24 Vac | 2 sec max | 6 sec max | Two-Stage, Rapid Opening |

Replacement Parts or Accessories

| OS Number | Description | Used With |
|-----------|--|---|
| 116930 | Replacement Coil | V88A |
| 116931 | Replacement Coil, 120Vac,60Hz | V48A |
| 116932 | Replacement Coil, 220-240Vac,50/60Hz | V48A |
| 118888 | 24V 60 Hz Replacement Coil | V88J |
| 139937 | Replacement coil, 120Vac, 60Hz | V48J |
| 195171 | Replacement Coil, 24Vac, 50Hz | V88 |
| 204480 | Regulator vent pipe fitting to be used with V4843/V8843B,C,L,N and V4844/V8844B,C,L,N and V4943/V8943, V4944/V8944 | V4843, V4844, V8844, V4943, V8943, V4944, V8944 |
| 122160 | Orifice- .018 inch | V48, V88 |
| 124674 | Orifice- .011 inch | V48, V88 |

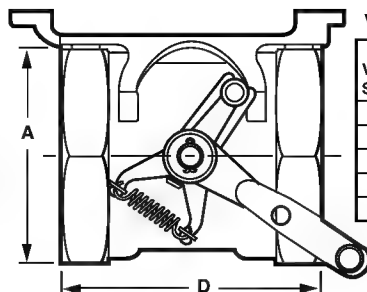
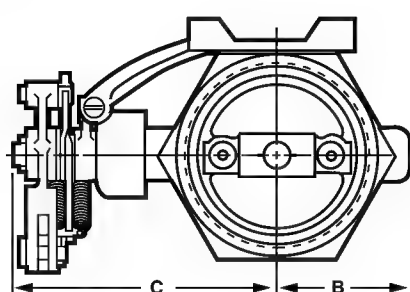
Firing Rate Gas Valves

V51E Butterfly Gas/Air Valve



Provides modulating control of natural, manufactured, LP gases or air.

Dimension Diagrams



V51E DIMENSIONS

| VALVE SIZE (in.) | A ¹ | | B ¹ | | C ² | | D ¹ | |
|---------------------|----------------|-------|----------------|------|----------------|-------|----------------|-------|
| | in. | mm | in. | mm | in. | mm | in. | mm |
| 1 1/2 | 2 21/32 | 67.5 | 1 9/16 | 39.7 | 4 1/4 | 108.0 | 3 1/32 | 77.0 |
| 2 | 3 5/32 | 80.2 | 1 13/16 | 46.0 | 4 1/4 | 108.0 | 3 17/32 | 89.7 |
| 2 1/2 | 3 27/32 | 97.6 | 2 5/16 | 58.7 | 4 13/16 | 122.2 | 4 23/32 | 119.9 |
| 3 | 4 1/32 | 102.4 | 2 25/64 | 60.7 | 5 | 127.0 | 4 23/32 | 119.9 |
| 4 | 5 21/64 | 135.3 | 3 5/32 | 80.2 | 5 3/8 | 136.5 | 5 17/64 | 133.8 |

¹ MAXIMUM DIMENSIONS.

² NOMINAL DIMENSIONS.

M9532

Body Material: Aluminum

Valve pattern: Straight-through

Mounting: Motor shaft horizontal

Temperature Ratings: 32 F to 140 F (0 C to 60 C)

Approvals:

Underwriters Laboratories, Inc: File no. MH5968 Vol. 1 Sec. 1, Guide no. MHKZ

Accessories:

Q100B1006 Linkage- Connects Modutrol motor to V51E Butterfly Valve.

| Product Number | Type of Gas | Capacity | | Pipe Size | | Pressure Ratings | |
|----------------|------------------------------------|-----------|--------------------------|-----------|--------|------------------|----------|
| | | cfh | m ³ /hr | (inch) | (mm) | (psi) | (kPa) |
| V51E1000 | Air, natural, manufactured, and LP | 4200 cfh | 118.9 m ³ /hr | 1 1/2 in. | 38 mm | 5 psi | 34.5 kPa |
| V51E1018 | Air, natural, manufactured, and LP | 9210 cfh | 260.7 m ³ /hr | 2 in. | 51 mm | 5 psi | 34.5 kPa |
| V51E1034 | Air, natural, manufactured, and LP | 8390 cfh | 199.8 m ³ /hr | 2 1/2 in. | 64 mm | 5 psi | 34.5 kPa |
| V51E1059 | Air, natural, manufactured, and LP | 14640 cfh | 414.5 m ³ /hr | 3 in. | 76 mm | 5 psi | 34.5 kPa |
| V51E1075 | Air, natural, manufactured, and LP | 33000 cfh | 934.2 m ³ /hr | 4 in. | 101 mm | 5 psi | 34.5 kPa |

Firing Rate Gas Valve Parts

| OS Number | Description |
|--------------|--|
| 127413 | Bracket for 2 in. V51E butterfly valve for use with Modutrol Motor |
| 127415 | Bracket, 2-1/2 in. For V51E for use with Modutrol Motor |
| 32003396-001 | V51E mounting bracket for 1-1/2 in. And 2 in. Valves for use with ML7999 actuator. |
| 32003396-002 | V51E mounting bracket for 2-1/2 in. - 4 in. Valves for use with ML7999 actuator. |
| 4074EJU | Bag Assembly including mounting bracket for V51E1216 |
| 49085B | Strain Release Assembly for V51E |
| 15271/0021 | Toggle for V51E. |
| 16350/0021 | Actuating pin for V51E |
| 16351/0021 | Pin relief operating arm for V51 |
| 49084/0021 | Adjusting arm for V51E. |
| 49087/0638 | Spring for V51E. |
| 49090/0020 | Yoke pin-for mounting actuating arm to linkage V51E |
| 49095/0021 | Steel washer for V51E |
| 80897BC/0021 | Stop screws for stop bracket for V51E. Two required. |

Products are available through authorized Honeywell distributors

Selection Chart: V5055 and V5097 Industrial Gas Valves with V4055, V4062 or V9055 Fluid Power Actuators

The chart below describes every model of V5055 or V5097 Valve in the left column, and every model of Fluid Power Actuator across the top. While it's possible to combine any valve with any actuator, we've marked the recommended valve/actuator combinations which cover most applications with a ●.

Each valve described in the left column is available:

- in these sizes: 3/4 to 3 in. (NPT or parallel BSP). V5055A,B,C are also available in 4 in. size (flange connection only).
 - With upstream and/or downstream tap.
- Options available on some Fluid Power Actuators include:
- Damper arm shaft, with or without spring return.
 - NEMA 4 enclosure.

- Fast or slow open time (13 or 26 seconds).
- Auxiliary switch.
- Valve seal overtravel interlock switch.

The Q5055A Adapter Assembly is available for adapting ITT General V710 gas valve to accept Honeywell gas valve actuators (V4055, V4062 and V9055) as replacements for ITT General AH2, AH4, AH8 gas valve actuators. Refer to Index for specific page number of Q5055A.

For complete specifications and ordering information on V5055 and V5097 Valves and V4055, V4062 and V9055 Fluid Power Actuators, refer to Index for specific page numbers.

| Valve | Actuator | | | | | | | | | |
|---|-------------------------------|-------------------------------|--|--|---|---------------------------|----------------------------------|--|-----------------------------------|--|
| | V4055A On-Off Lo Press. | V4055B On-Off Hi Press. | V4055D On-Off Lo Press. Valve Seal Overtravel Interlock | V4055E On-Off Hi Press. Valve Seal Overtravel Interlock | V4055F Manual Reset Safety Shutoff Valve Seal Overtravel Interlock | V4055G Manual Reset | V4062A Hi-Lo-Off Lo Press. | V4062D Modulating Lo Press. Valve Seal Overtravel Interlock | V9055A Modulating Lo Press. | V9055D Modulating Lo Press. Valve Seal Overtravel Interlock |
| V5055A, V5097A On-Off Lo Pressure | ● | ● ^b | | | | ● | | | | |
| V5055B, V5097B Lo Pressure Characterized Guide ^a | ● | ● ^b | | | | ● | ● | | ● | |
| V5055C, V5097C Lo Pressure Double Seal ^c | | | ● | ● ^b | ● | | | ● | | ● |
| V5055D, V5097D On-Off Hi Pressure | ● ^b | ● | | | | | | | | |
| V5055E, V5097E Hi Pressure Double Seal ^c | | | ● ^b | ● | | | | ● ^b | | ● ^b |

^a Provides a predictable relationship between stem travel and gas flow.

^b See next page for higher opening and close-off ratings for these combinations.

^c Use with actuators having valve seal overtravel interlock

VALVE ACTUATOR APPROVALS:

The following combinations of V5055 and V5097 Valves, and V4055, V4062 and V9055 Fluid Power Actuators are approved by these agencies.

UNDERWRITERS LABORATORIES INC. LISTED: MH1639

V4055A/V5055A-E (3/4-4 in.) or V5097A-E (3/4-3 in.).
V4055B/V5055A-E (3/4-4 in.) or V5097A-E (3/4-3 in.).
V4055D/V5055A-E (3/4-4 in.) or V5097A-E (3/4-3 in.).
V4055E/V5055A-E (3/4-4 in.) or V5097A-E (3/4-3 in.).
V4055F/V5055A-E (3/4-4 in.^a) or V5097A-E (3/4-3 in.).
V4055G/V5055A-E (3/4-4 in.^a) or V5097A-E (3/4-3 in.).
V4062A,D/V5055A-E (3/4-4 in.) or V5097A-E (3/4-3 in.).
V9055A,D/V5055A,B,C,E (3/4-4 in.) or V5097A-E (3/4-3 in.).

CANADIAN GAS ASSOCIATION CERTIFIED: Report No. 1209-SSV-5965-60 Hz models only.

VALVE-ACTUATOR PRESSURE RATINGS:

| Valve | Actuator | | | | | | | | | | | |
|--|-----------------------|------|------------------------|-------|-----------------------|-------|------------------------|-------|---------------------------|------|------------------------|-------|
| | V4055A,D ^a | | | | V4055B,E ^a | | | | V4062, V9055 ^a | | | |
| | Diff. ^b | | Close-Off ^c | | Diff. ^b | | Close-Off ^c | | Diff. ^b | | Close-Off ^c | |
| | psi | kPa | psi | kPa | psi | kPa | psi | kPa | psi | kPa | psi | kPa |
| V5055A,C and V5097A,C (3/4 to 3 in.) | 5 | 34.5 | 15 | 103.4 | 15 | 103.4 | 15 | 103.4 | 5 | 34.5 | 15 | 103.4 |
| V5055A,C (4 in.) | 3 | 20.7 | 15 | 103.4 | 5 | 34.5 | 15 | 103.4 | 3 | 20.7 | 15 | 103.4 |
| V5055B and V5097B (3/4 to 3 in.) | 5 | 34.5 | 15 | 103.4 | 15 | 103.4 | 15 | 103.4 | 5 | 34.5 | 15 | 103.4 |
| V5055B (4 in.) | 3 | 20.7 | 15 | 103.4 | 5 | 34.5 | 15 | 103.4 | 3 | 20.7 | 15 | 103.4 |
| V5055D,E and V5097D,E (3/4, 1, 1-1/4, 1-1/2 in.) | 5 | 34.5 | 75 | 517.1 | 25 | 172.4 | 75 | 517.1 | 5 | 34.5 | 75 | 517.1 |
| V5055D,E and V5097D,E (2, 2-1/2, 3 in.) | 5 | 34.5 | 45 | 310.3 | 15 | 103.4 | 45 | 310.3 | 5 | 34.5 | 45 | 310.3 |

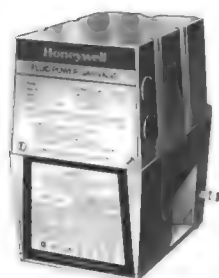
^a Use a V4055D, V4055E, V4062D or V9055D (with valve-closed indication switch) with a V5055C,E or V5097C,E (with double seal) for a Valve Seal Overtravel Interlock.

^b Maximum operating pressure differential.

^c Maximum close-off pressure without seal leakage. This is the maximum allowable pressure drop to which a valve may be subjected while fully closed, and is independent of the valve body rating.

Fluid Actuators

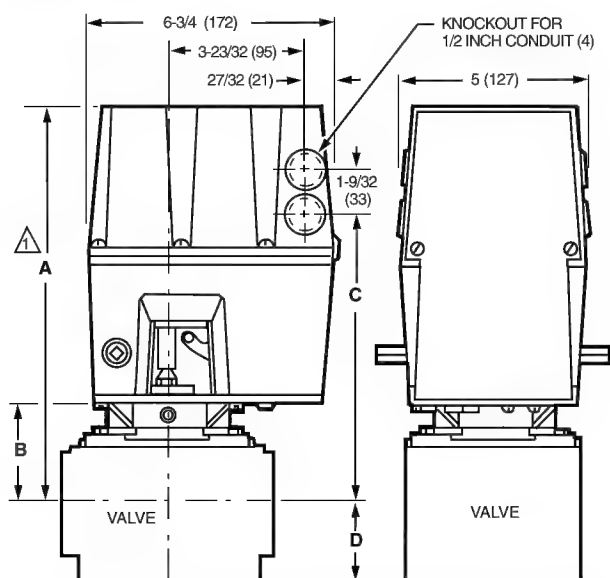
V4055A,B,D,E On-Off Fluid Power Gas Valve Actuator



Use with V5055 Valve to control gas supply to commercial and industrial burners.

- Use where smooth lightoff is important.
- One-second maximum closing time.
- Always displays the valve position, when open a red indicator appears and closed a yellow indicator appears.
- Mount in any position directly to valve bonnet with three setscrews.
- Provide final safety shutoff service when used with V5055 valve.

Dimension Diagrams



△ ALLOW 4 INCH (102 MM) CLEARANCE FOR ACTUATOR REMOVAL. M17755

Temperature Ratings: -40 F to +150 F (-40 C to +66 C)

Contact Ratings:

| Auxiliary Switch | | Proof of Closure (Factory Mutual) Switch | |
|---------------------------|---------------------------|--|---------------------------|
| 120 Vac | 120 Vac | 120 Vac | 120 Vac |
| 9.8 AFL, 58.8 ALR, 1/2 hp | 4.9 AFL, 29.4 ALR, 1/2 hp | 9.8 AFL, 58.8 ALR, 1/2 hp | 4.9 AFL, 29.4 ALR, 1/2 hp |

Accessories:

7616BR Crank Arm assembly with clip for Damper Arm of V4055, V4062 or V9055

Electrical Ratings

| Model | Power Supply | | Opening (Standard) | | | | Opening (Fast) | | | | Holding | | |
|----------|--------------|-------|--------------------|------|------|-----|----------------|------|------|-----|---------|------|----|
| | Vac | Hz | Inrush | W | A | VA | Inrush | W | A | VA | W | A | VA |
| V4055A,D | 120 Vac | 60 Hz | 3.9 | 50.0 | 0.94 | 115 | 5.4 | 71.0 | 1.33 | 160 | 9.5 | 0.12 | 14 |
| V4055A,D | 240 Vac | 60 Hz | 2.6 | 51.0 | 0.45 | 115 | 4.0 | 71.5 | 0.68 | 180 | 9.2 | 0.06 | 14 |
| V4055B,E | 120 Vac | 60 Hz | 5.4 | 60 | 0.94 | 115 | — | — | — | — | 9.5 | 0.16 | 19 |

| Product Number | Damper Shaft | Installed Switches | | Maximum Operating Pressure | Timing | | Description | Comments |
|----------------|--------------|------------------------------------|------------------|----------------------------|-----------------|---------|--|----------|
| | | Auxiliary | Proof of Closure | | Closing < 1 sec | Opening | | |
| V4055A1007 | No | No | No | 5 psi | Yes | 26 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |
| V4055A1031 | No | No | No | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |
| V4055A1064 | Yes | No | No | 5 psi | Yes | 26 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |
| V4055A1080 | Yes | No | No | 5 psi | Yes | 26 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |
| V4055A1098 | Yes | No | No | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |
| V4055A1114 | Yes | No | No | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |
| V4055A1296 | No | Yes - adjusted to 90 degree stroke | No | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |

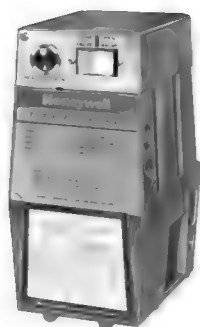
Products are available through authorized Honeywell distributors

Fluid Actuators

| Product Number | Damper Shaft | Installed Switches | | Maximum Operating Pressure | Timing | | Description | Comments |
|----------------|-----------------------------------|--------------------|------------------|----------------------------|-----------------|---------|--|------------------|
| | | Auxiliary | Proof of Closure | | Closing < 1 sec | Opening | | |
| V4055A1304 | Yes with return spring installed. | No | No | 5 psi | Yes | 26 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | — |
| V4055A1312 | No | No | No | 5 psi | Yes | 26 sec | ON-OFF actuator. Normally used with V5055/V5907A,B valve bodies. Low pressure. | NEMA 4 Enclosure |
| V4055B1021 | Yes | No | No | 15 or 25 psi | Yes | 26 sec | ON-OFF actuator. Normally used with 4 in. V5055/V5907A,B and all V5055D valve bodies. High pressure. | — |
| V4055B1039 | Yes | No | No | 15 or 25 psi | Yes | 13 sec | ON-OFF actuator. Normally used with 4 in. V5055/V5907A,B and all V5055D valve bodies. High pressure. | — |
| V4055D1001 | Yes | No | Yes | 5 psi | Yes | 26 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | — |
| V4055D1019 | Yes | No | Yes | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | — |
| V4055D1027 | No | Yes | Yes | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | NEMA 4 Enclosure |
| V4055D1035 | No | Yes | Yes | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | — |
| V4055D1043 | No | No | Yes | 5 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | — |
| V4055E1016 | Yes | No | Yes | 15 or 25 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | — |
| V4055E1024 | Yes | Yes | Yes | 15 or 25 psi | Yes | 26 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | NEMA 4 Enclosure |
| V4055E1040 | Yes | No | Yes | 15 or 25 psi | Yes | 13 sec | ON-OFF actuator. Normally used with V5055/V5907C valve bodies. Low pressure. | NEMA 4 Enclosure |

Fluid Actuators

V4055F,G Manual Reset Safety Shut-off Gas Valve Actuators



Provide manual reset, safety shut-off functions as required on FM, IHEA-IRI and NFPA 86A,B,C industrial furnaces, ovens and kilns.

- Close in one second maximum.
- Continuously displays the valve position with a red indicator when closed.
- Mount directly to valve bonnet with three setscrews.

Temperature Ratings: -40 F to +150 F (-40 C to +66 C)

Contact Ratings:

| Proof of Closure (Factory Mutual) Switch | |
|--|---------------------------|
| 120 Vac | 120 Vac |
| 9.8 AFL, 58.8 ALR, 1/2 hp | 4.9 AFL, 29.4 ALR, 1/2 hp |

| Product Number | Damper Shaft | Electrical Ratings (Vac) | Electrical Ratings (Hz) | Installed Switches | | Maximum Operating Pressure | Timing | | Description |
|----------------|--------------|--------------------------|-------------------------|--------------------|------------------|----------------------------|-----------------|---------|---|
| | | | | Auxiliary | Proof of Closure | | Closing < 1 sec | Opening | |
| V4055F1006 | No | 120 Vac | 60 Hz | No | Yes | 5 psi | Yes | 13 sec | Manual reset safety shutoff valve with proof of closure switch. |
| V4055G1004 | No | 120 Vac | 60 Hz | No | No | 5 psi | Yes | 13 sec | Manual reset safety shutoff valve. |

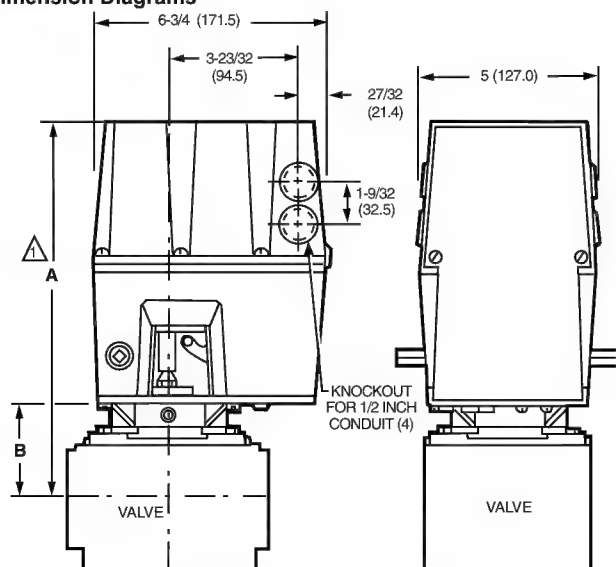
V4062 Off-Lo-Hi Fluid Power Gas Valve Actuators



Control gas supply for commercial and industrial burners. Valve opens to low fire position when power is applied; valve opens all the way on demand.

- Provide final safety shutoff service when used with V5055 valve.
- One-second maximum closing time.
- Continuously displays the valve position with a red indicator when open and a yellow indicator when closed.
- Mount in any position directly to valve bonnet with three setscrews.
- Use with Q5055A Adapter Assembly to replace ITT General V710 gas valves.

Dimension Diagrams



△ ALLOW 4 IN. (101.6 MM) CLEARANCE FOR ACTUATOR REMOVAL.

| VALVE SIZE INCH | V5055 | | | | V5097 | | | |
|--------------------|--------|-------|---------|-------|--------|-----|-------|----|
| | DIM A | | DIM B | | DIM A | | DIM B | |
| | IN. | MM | IN. | MM | IN. | MM | IN. | MM |
| 3/4 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 11-1/8 | 283 | 2-3/4 | 70 |
| 1 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 11-1/8 | 283 | 2-3/4 | 70 |
| 1-1/4 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 11-1/8 | 283 | 2-3/4 | 70 |
| 1-1/2 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 11-1/8 | 283 | 2-3/4 | 70 |
| 2 | 11-1/4 | 285.8 | 2-7/8 | 73.0 | 11-3/4 | 298 | 3-3/8 | 86 |
| 2-1/2 | 11-3/4 | 298.5 | 3-3/8 | 85.7 | 11-3/4 | 298 | 3-3/8 | 86 |
| 3 | 11-3/4 | 298.5 | 3-3/8 | 85.7 | 11-3/4 | 298 | 3-3/8 | 86 |
| 4 | 14-1/8 | 358.8 | 5-13/16 | 147.6 | — | — | — | — |

M10981

Temperature Ratings: -40 F to +150 F (-40 C to +66 C)

Electrical Ratings:

| Model | Power Supply | | Opening | | Holding | |
|----------|--------------|-------|---------|-----|---------|----|
| | Vac | Hz | W | VA | W | VA |
| V4062A,D | 120 Vac | 60 Hz | 59.5 | 129 | 19.0 | 28 |
| | 208 Vac | 60 Hz | 63.5 | 129 | 18.2 | 28 |
| | 240 Vac | 60 Hz | 60.5 | 129 | 18.4 | 28 |

Contact Ratings:

| Auxiliary Switch | | Proof of Closure (Factory Mutual) Switch | |
|---------------------------|---------------------------|--|---------------------------|
| 120 Vac | 120 Vac | 120 Vac | 120 Vac |
| 9.8 AFL, 58.8 ALR, 1/2 hp | 4.9 AFL, 29.4 ALR, 1/2 hp | 9.8 AFL, 58.8 ALR, 1/2 hp | 4.9 AFL, 29.4 ALR, 1/2 hp |

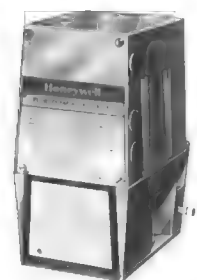
Accessories:

7616BR Crank Arm assembly with clip for Damper Arm of V4055, V4062 or V9055

| Product Number | Damper Shaft | Installed Switches | | Maximum Operating Pressure | Timing | | Description |
|----------------|-----------------------------------|------------------------------------|------------------|----------------------------|-----------------|---------|---|
| | | Auxiliary | Proof of Closure | | Closing < 1 sec | Opening | |
| V4062A1008 | Yes | No | No | 5 psi | Yes | 26 sec | HI-LO-OFF actuator for use with V5055B and V5097B valve bodies. Low pressure. |
| V4062A1123 | Yes with return spring installed. | Yes | No | 5 psi | Yes | 26 sec | HI-LO-OFF actuator for use with V5055B and V5097B valve bodies. Low pressure. |
| V4062A1131 | Yes | No | No | 5 psi | Yes | 13 sec | HI-LO-OFF actuator for use with V5055B and V5097B valve bodies. Low pressure. |
| V4062A1156 | No | No | No | 5 psi | Yes | 26 sec | HI-LO-OFF actuator for use with V5055B and V5097B valve bodies. Low pressure. |
| V4062A1198 | Yes with return spring installed. | Yes - adjusted to 90 degree stroke | No | 5 psi | Yes | 13 sec | HI-LO-OFF actuator for use with V5055B and V5097B valve bodies. Low pressure. |
| V4062D1010 | Yes | No | Yes | 5 psi | Yes | 13 sec | HI-LO-OFF actuator for use with V5055B and V5097B valve bodies. Low pressure. |

Fluid Actuators

V9055 Modulating Fluid Power Gas Valve Actuators



Control gas supply for commercial and industrial burners. Valve opens to low fire position when power is applied, then modulates to meet firing rate controller demand.

- Include intergal shaft to drive combustion air damper in unison with valve.
- One-second maximum closing time.
- Always display the valve position, when open a red indicator appears and closed a yellow indicator appears.
- Mount in any position directly to valve bonnet with three setscrews.
- Use with Q5055A Adapter Assembly to replace ITT General Actuators on ITT General V710 gas valves.

Temperature Ratings: -40 F to +125 F (-40 C to +52 C)

Power Consumption:

Opening: 60W, 122VA

Holding: 20W, 32 VA

Contact Ratings:

| Proof of Closure (Factory Mutual) Switch | |
|--|---------------------------|
| 120 Vac | 120 Vac |
| 9.8 AFL, 58.8 ALR, 1/2 hp | 4.9 AFL, 29.4 ALR, 1/2 hp |

Accessories:

203422C 4-20 ma Adapter for V9055

7616BR Crank Arm assembly with clip for Damper Arm of V4055, V4062 or V9055

| Product Number | Damper Shaft | Electrical Ratings (Vac) | Electrical Ratings (Hz) | Installed Switches | | Maximum Operating Pressure | Timing | | Description | Comments |
|----------------|-----------------------------------|--------------------------|-------------------------|--------------------|------------------|----------------------------|-----------------|---------|---|------------------|
| | | | | Auxiliary | Proof of Closure | | Closing < 1 sec | Opening | | |
| V9055A1055 | Yes | 120 Vac | 60 Hz | No | No | 5 psi | Yes | 26 sec | Modulating-OFF actuator for use with V5055B valve bodies. Low pressure. | — |
| V9055A1063 | Yes | 120 Vac | 60 Hz | No | No | 5 psi | Yes | 26 sec | Modulating-OFF actuator for use with V5055B valve bodies. Low pressure. | NEMA 4 Enclosure |
| V9055A1113 | Yes with return spring installed. | 120 Vac | 60 Hz | No | No | 5 psi | Yes | 26 sec | Modulating-OFF actuator for use with V5055B valve bodies. Low pressure. | — |
| V9055D1000 | Yes | 120 Vac | 60 Hz | No | Yes | 5 psi | Yes | 26 sec | — | — |

Fluid Actuator Accessories and Parts

| OS Number | Description | Used With |
|-----------|--|---------------------|
| 118778 | Damper Arm Spring Return (L.H.) for V4055, V4062 or V9055 | V9055, V4055, V4062 |
| 118779 | Damper Arm Spring Return (R.H.) for V4055, V4062 or V9055 | V9055, V4055, V4062 |
| 118846 | Brass Tubing When adding Spring Return, for V4055, V4062 or V9055 | V9055, V4055, V4062 |
| 130618 | Replacement clip for damper shaft on V4055, V4062 or V9055 | V9055, V4055, V4062 |
| 133568 | Adjustable Valve Position Indicator Switch for V4055, V4062 or V9055 | V9055, V4055, V4062 |
| 133569 | Replacement Valve Closed Position Indicator Switch for V4055, V4062 or V9055 | V9055, V4055, V4062 |
| 135796 | Adjustment Wrench for V4062 | V4062 |
| 203422C | 4-20 ma Adapter for V9055 | V4062, V9055 |
| 7616BR | Crank Arm assembly with clip for Damper Arm of V4055, V4062 or V9055 | V9055, V4055, V4062 |

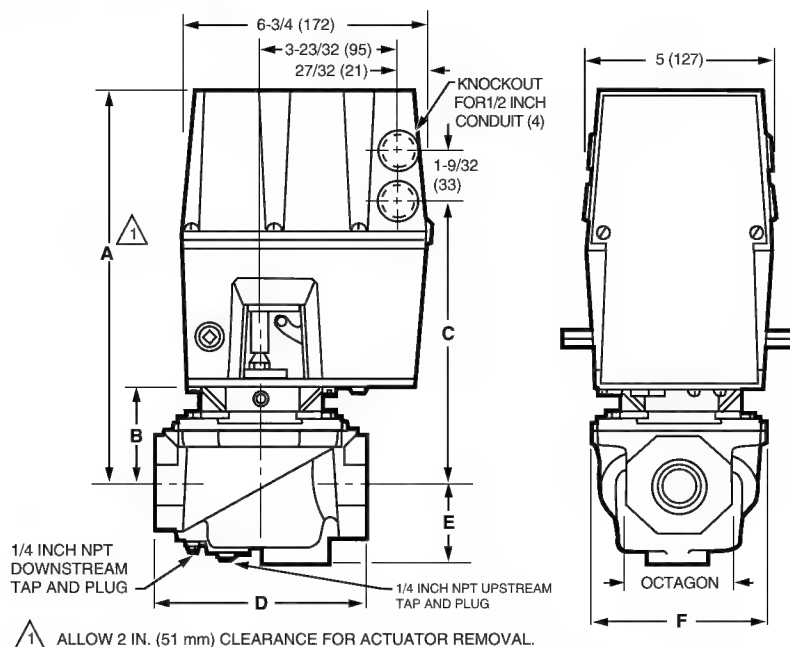
V5055 Industrial Gas Valves



Safety shutoff valves used with V4055, V4062 and V9055 fluid power actuators to control gas flow to commercial and industrial burners.

- Use with natural or LP gases.
- Mount directly in gas supply line.
- Include 1/4 in. NPT upstream and downstream taps and plug; 4 in. models have only flanged connections.
- V5055 normally closed valves are rated for final shutoff service (safety shutoff).
- V5055A,C,D,E Valves are for On-Off service.
- V5055B Valve has a characterized guide and in combination with the V4055, V4062, and V9055 Fluid Power Actuators, provides slow-opening, hi-lo-off, and modulating functions respectively.
- V5055C,E,F Valves have a double seal and are used with V4055D,E Actuators to provide proof-of-closure switch and valve seal overtravel interlock.
- V5055D,E,F Valves are for high pressure applications.

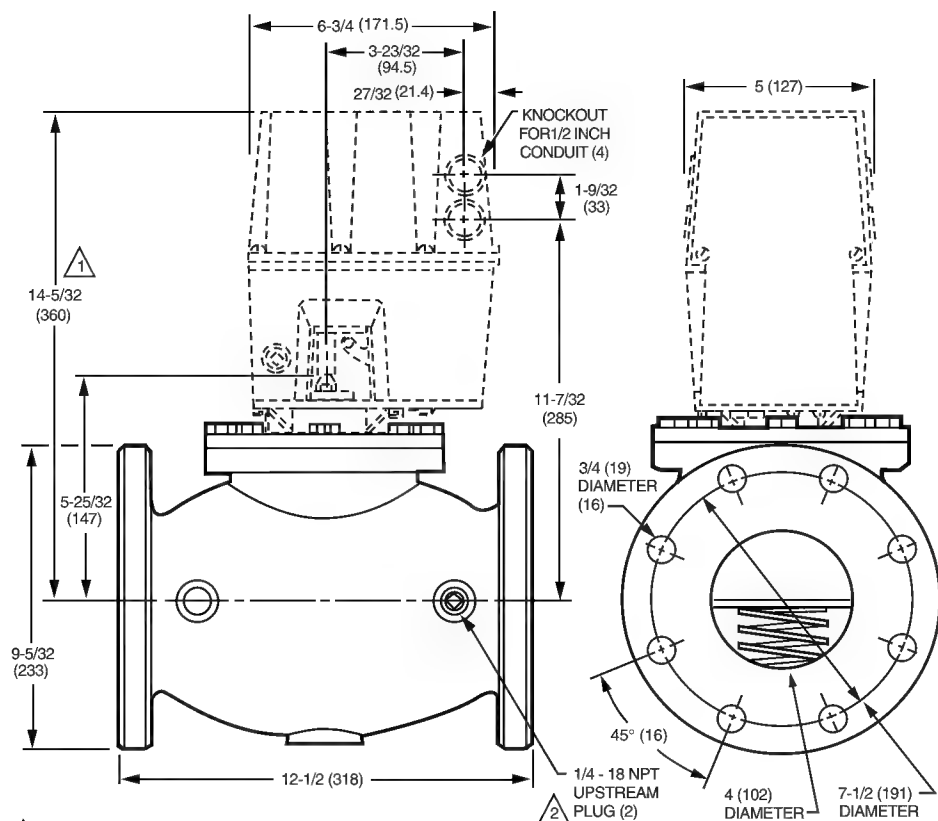
Dimension Diagrams



| VALVE SIZE INCH | DIM A | | DIM B | | DIM C | | DIM D | | DIM E | | DIM F | | OCTAGON | |
|-----------------------|--------|-------|-------|------|---------|-------|-------|-------|-------|------|---------|-------|---------|-------|
| | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM |
| 3/4 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 8-3/16 | 208.0 | 5-3/4 | 146.1 | 2-1/4 | 57.2 | 4-13/16 | 122.2 | 2-13/16 | 71.4 |
| 1 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 8-3/16 | 208.0 | 5-3/4 | 146.1 | 2-1/4 | 57.2 | 4-13/16 | 122.2 | 2-13/16 | 71.4 |
| 1-1/4 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 8-3/16 | 208.0 | 5-3/4 | 146.1 | 2-1/4 | 57.2 | 4-13/16 | 122.2 | 2-13/16 | 71.4 |
| 1-1/2 | 11-1/8 | 282.6 | 2-3/4 | 69.9 | 8-3/16 | 208.0 | 5-3/4 | 146.1 | 2-1/4 | 57.2 | 4-13/16 | 122.2 | 2-13/16 | 71.4 |
| 2 | 11-1/4 | 285.8 | 2-7/8 | 73.0 | 8-5/16 | 211.1 | 8-3/8 | 212.7 | 2-3/4 | 69.9 | 7-19/32 | 192.9 | 3-1/2 | 88.9 |
| 2-1/2 | 11-3/4 | 298.5 | 3-3/8 | 85.7 | 8-13/16 | 223.8 | 9-1/4 | 235.0 | 2-3/4 | 69.9 | 7-19/32 | 192.9 | 4-1/2 | 114.3 |
| 3 | 11-3/4 | 298.5 | 3-3/8 | 85.7 | 8-13/16 | 223.8 | 9-1/4 | 235.0 | 2-3/4 | 69.9 | 7-19/32 | 192.9 | 4-1/2 | 114.3 |

M9585

Industrial Gas Valves



1 ALLOW 2 IN. (51 mm) CLEARANCE ABOVE V4055 SO IT MAY BE REMOVED FROM VALVE.

2 DIMENSIONS ON DIN-APPROVED VALVES: 1/4 - 19 BSP.PL UPSTREAM PLUG (2), .71 IN (18 mm) DIAMETER BOLT HOLE (16), 7.087 IN (180 mm) DIAMETER BOLT CIRCLE.

M9584

Operating Temperature Range: -40 F to 150 F (-40 C to 66 C)

Temperature Ratings when used with V9055: -40 F to 125 F (-40 C to 52 C)

Approvals:

Canadian Standards Association: Certificate No. 158158-1205788, Guide No. 3371-04, 3371-84

Factory Mutual: 1D9A2.AF

Industrial Risk Insurers: Acceptable (used with V4055A,B,D,E, V4062, V9055)

Underwriters Laboratories, Inc: File No. MH1639, Guide No. YIOZ (used with V4055A,B,D,E, V4062, V9055)

| Product Number | Pipe size (in.) | Pipe Thread | Capacity | Maximum Operating Differential Pressure | | Description | Includes | Comments |
|----------------|-----------------|-------------|---|---|-----------------------|------------------------|--|----------|
| | | | | V4055A,D; V4062 | V4055B or E | | | |
| V5055A1004 | 1 in. | NPT | 960 cf/hr; 27.2 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug 1/4 in. -18 NPT downstream tap and plug | — |
| V5055A1012 | 1 1/4 in. | NPT | 1406 cf/hr; 39.8 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug 1/4 in. -18 NPT downstream tap and plug | — |
| V5055A1020 | 1 1/2 in. | NPT | 1717 cf/hr; 48.6 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug 1/4 in. -18 NPT downstream tap and plug | — |
| V5055A1038 | 2 in. | NPT | 3620 cf/hr; 102.5 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug 1/4 in. -18 NPT downstream tap and plug | — |
| V5055A1046 | 2 1/2 in. | NPT | 4250 cf/hr; 120 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug 1/4 in. -18 NPT downstream tap and plug | — |

Products are available through authorized Honeywell distributors

| Product Number | Pipe size (in.) | Pipe Thread | Capacity | Maximum Operating Differential Pressure | | Description | Includes | Comments |
|----------------|-----------------|-------------|--|---|-----------------------|--|---|----------|
| | | | | V4055A,D; V4062 | V4055B or E | | | |
| V5055A1053 | 3 in. | NPT | 5230 cf/hr; 148 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055A1228 | 4 in. | Flanged | 10200 cf/hr; 288.8 m ³ /hr | 3 psi (20.7 kPa) | 5 psi (34.5 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055A1343 | 3/4 in. | NPT | 665 cf/hr; 18.8 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1002 | 1 in. | NPT | 960 cf/hr; 27.2 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1010 | 1 1/4 in. | NPT | 1406 cf/hr; 39.8 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1028 | 1 1/2 in. | NPT | 1717 cf/hr; 48.6 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1069 | 2 in. | NPT | 3620 cf/hr; 102.5 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1077 | 2 1/2 in. | NPT | 4250 cf/hr; 120 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1085 | 3 in. | NPT | 5230 cf/hr; 148 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1150 | 4 in. | Flanged | 9180 cf/hr; 259.9 m ³ /hr | 3 psi (20.7 kPa) | 5 psi (34.5 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055B1234 | 3/4 in. | NPT | 665 cf/hr; 18.8 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055C1000 | 2 in. | NPT | 3620 cf/hr; 102.5 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |

Industrial Gas Valves

| Product Number | Pipe size (in.) | Pipe Thread | Capacity | Maximum Operating Differential Pressure | | Description | Includes | Comments |
|----------------|-----------------|-------------|---|---|-----------------------|---|---|----------|
| | | | | V4055A,D; V4062 | V4055B or E | | | |
| V5055C1018 | 2 1/2 in. | NPT | 4250 cf/hr; 120 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055C1026 | 3 in. | NPT | 5230 cf/hr; 148 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055C1034 | 1 in. | NPT | 960 cf/hr; 27.2 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055C1042 | 1 1/4 in. | NPT | 1406 cf/hr; 39.8 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055C1059 | 1 1/2 in. | NPT | 1717 cf/hr; 48.6 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055C1109 | 4 in. | Flanged | 9180 cf/hr; 259.9 m ³ /hr | 3 psi (20.7 kPa) | 5 psi (34.5 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055C1182 | 3/4 in. | NPT | 665 cf/hr; 18.8 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055D1008 | 1 in. | NPT | 960 cf/hr; 27.2 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055D1016 | 1 1/4 in. | NPT | 1406 cf/hr; 39.8 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055D1024 | 1 1/2 in. | NPT | 1717 cf/hr; 48.6 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055D1032 | 2 in. | NPT | 3620 cf/hr; 102.5 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off for high pressure applications | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055D1040 | 2 1/2 in. | NPT | 4250 cf/hr; 120 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off for high pressure applications | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055D1057 | 3 in. | NPT | 5230 cf/hr; 148 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off for high pressure applications | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055D1065 | 3/4 in. | NPT | 665 cf/hr; 18.8 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055E1005 | 2 in. | NPT | 3620 cf/hr; 102.5 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |

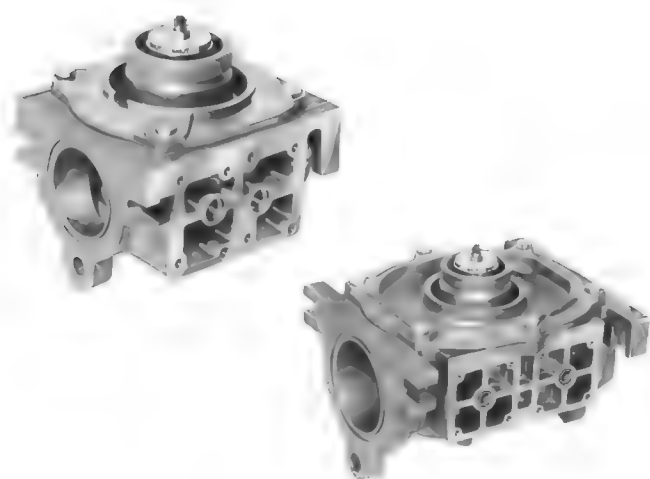
Products are available through authorized Honeywell distributors

Industrial Gas Valves

| Product Number | Pipe size (in.) | Pipe Thread | Capacity | Maximum Operating Differential Pressure | | Description | Includes | Comments |
|----------------|-----------------|-------------|---|---|-----------------------|---|---|---|
| | | | | V4055A,D; V4062 | V4055B or E | | | |
| V5055E1013 | 2 1/2 in. | NPT | 4250 cf/hr; 120 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055E1021 | 3 in. | NPT | 5230 cf/hr; 148 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055E1039 | 1 in. | NPT | 960 cf/hr; 27.2 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055E1047 | 1 1/4 in. | NPT | 1406 cf/hr; 39.8 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055E1054 | 1 1/2 in. | NPT | 1717 cf/hr; 48.6 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055E1062 | 3/4 in. | NPT | 665 cf/hr; 18.8 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | — |
| V5055F1003 | 1 in. | NPT | 960 cf/hr; 27.2 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | Meets Intent of DIN Seat Leakage Requirements |
| V5055F1011 | 1 1/2 in. | NPT | 1717 cf/hr; 48.6 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | Meets Intent of DIN Seat Leakage Requirements |
| V5055F1029 | 2 in. | NPT | 3620 cf/hr; 102.5 m ³ /hr | 5 psi (34.5 kPa) | 15 psi (103.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | Meets Intent of DIN Seat Leakage Requirements |
| V5055F1037 | 1 1/4 in. | NPT | 1406 cf/hr; 39.8 m ³ /hr | 5 psi (34.5 kPa) | 25 psi (172.4 kPa) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel | Includes 1/4 in. -18 NPT upstream tap and plug1/4 in. -18 NPT downstream tap and plug | Meets Intent of DIN Seat Leakage Requirements |

Industrial Gas Valves

V5097 Industrial Gas Valves



Operating Temperature Range: -40 F to 150 F (-40 C to 66 C)
Temperature Ratings when used with V9055: -40 F to 125 F (-40 C to 52 C)

Includes: Three 1/4 in. -18 NPT upstream and two 1/4 in. -18 NPT downstream taps.

Comments: Select Proper Pipe Adapter

Safety shutoff valves used with V4055, V4062 and V9055 fluid power actuators to control gas flow to commercial and industrial burners.

- Use with natural or LP gases.
- Mount directly in gas supply line.
- Two Valve body types. Small body type for 3/4 in., 1 in., 1-1/4 in., 1-1/2 in., 2 in. pipes. Large body types for 2 in., 2-1/2 in. and 3 in. pipes.
- Seven pipe adapter sizes from 3/4 in. to 3 in. have NPT or BSP threaded connections.
- Provides three 1/4 in. upstream and two 1/4 in. downstream tap and plug. CE version provides an additional downstream tap and plug.
- Yellow SHUT indicator attached to the valve stem provides an indication of the valve closed position.
- V5097A,C,D,E Valves are for on-off service.
- V5097B Valve has a characterized guide and in combination with the V4055, V4062 and V9055 Fluid Power Actuators, provides slow-opening, HI-LO-OFF, and modulating functions, respectively.
- V5097C,E Valves have a double seal and are used with V4055D,E Fluid Power Actuators to provide proof-of-closure switch and valve seal overtravel interlock.
- V5097D,E Valves are for high pressure applications.
- Two valve body types (small and large) applicable to server pipe size.

Approvals:

Canadian Standards Association: Certificate No. 158158-1205788, Guide No. 3371-04, 3371-84

Factory Mutual: Approved: Report No. J.I.1D9A2.AF

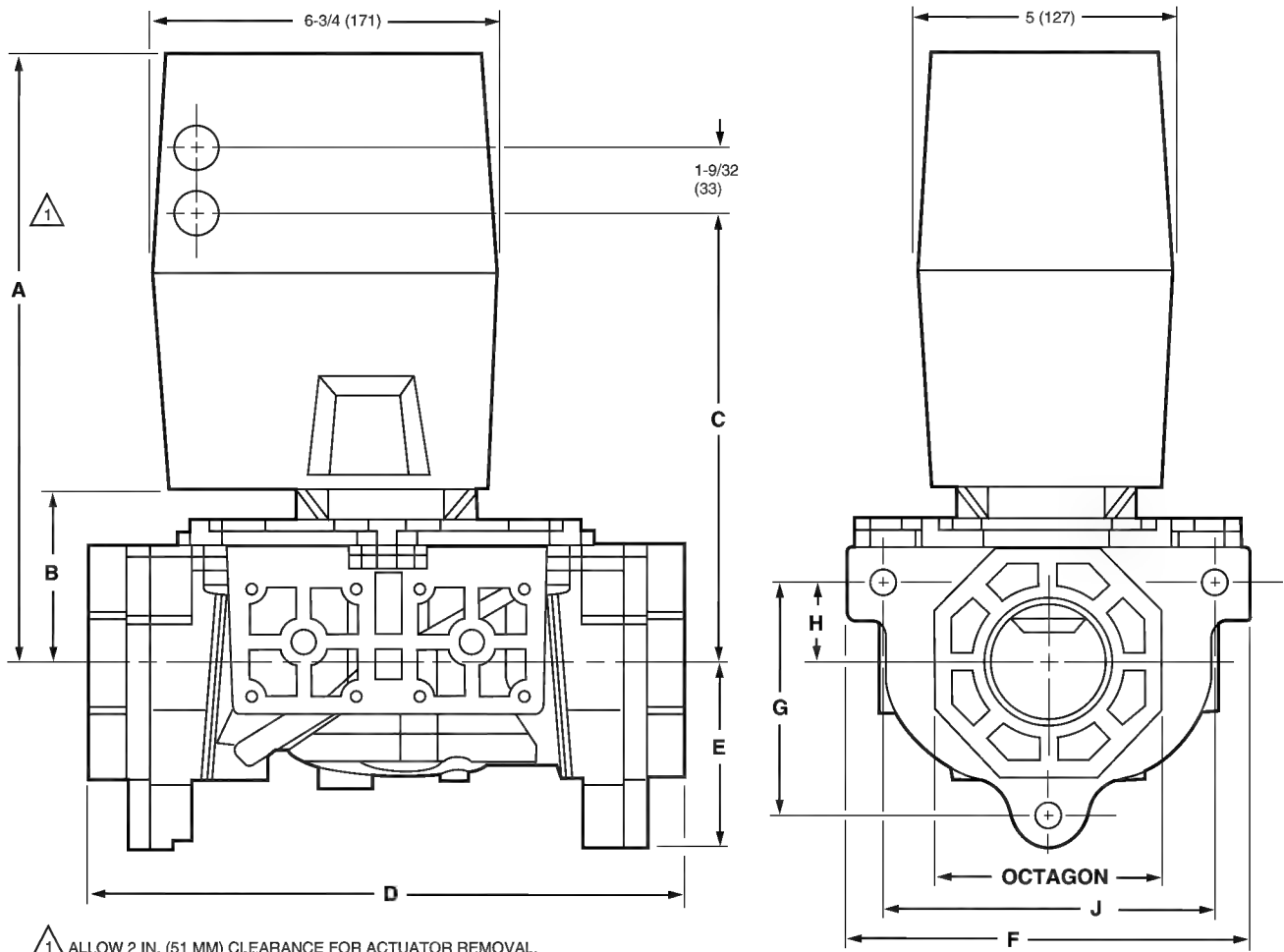
Industrial Risk Insurers: Acceptable (used with V4055A,B,D,E, V4062, V9055)

Underwriters Laboratories, Inc: File No. MH1639, Guide No. YIOZ

| Product Number | Pipe size (in.) | Integrated Valve Train Body Size | Capacity | Maximum Operating Differential Pressure | | Description |
|----------------|--|----------------------------------|--|---|------------------|--|
| | | | | V4055A,D; V4062 | V4055B or E | |
| V5097A1004 | 3/4 in. 1 in. 1 1/4 in. 2 in. | Small body | 665 cf/hr to 3620 cf/hr; 18.8 to 102.5 m ³ /hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off |
| V5097A1012 | 2 in. 2 1/2 in. 3 in. | Large body | 3620 cf/hr to 5230 cf/hr; 102.5 to 148.0 m ³ /hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off |
| V5097B1002 | 3/4 in. 1 in. 1 1/4 in. 2 in. | Small body | 665 cf/hr to 3620 cf/hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service |
| V5097B1010 | 2 in. 2 1/2 in. 3 in. | Large body | 3620 cf/hr to 5230 cf/hr; 102.5 to 148.0 m ³ /hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off with characterized guide for slow opening, HI-LO-OFF, or modulating service |
| V5097C1000 | 3/4 in. 1 in. 1 1/4 in. 2 in. | Small body | 665 cf/hr to 3620 cf/hr; 18.8 to 102.5 m ³ /hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off with Valve Seal Overtravel |
| V5097C1018 | 2 in. 2 1/2 in. 3 in. | Large body | 3620 cf/hr to 5230 cf/hr; 102.5 to 148.0 m ³ /hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off with Valve Seal Overtravel |
| V5097D1008 | 3/4 in. 1 in. 1 1/4 in. 2 in. | Small body | 665 cf/hr to 3620 cf/hr; 18.8 to 102.5 m ³ /hr | 5 psi (340 mbar) | 25 psi (1.6 bar) | On-off safety shut-off for high pressure applications |
| V5097D1016 | 2 in. 2 1/2 in. 3 in. | Large body | 3620 cf/hr to 5230 cf/hr; 102.5 to 148.0 m ³ /hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off for high pressure applications |
| V5097E1005 | 3/4 in. 1 in. 1 1/4 in. 2 in. | Small body | 665 cf/hr to 3620 cf/hr; 18.8 to 102.5 m ³ /hr | 5 psi (340 mbar) | 25 psi (1.6 bar) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel |
| V5097E1013 | 2 in. 2 1/2 in. 3 in. | Large body | 3620 cf/hr to 5230 cf/hr; 102.5 to 148.0 m ³ /hr | 5 psi (340 mbar) | 15 psi (1 bar) | On-off safety shut-off for high pressure applications, with Valve Seal Overtravel |

Products are available through authorized Honeywell distributors

Dimension Diagrams



| VALVE SIZE (IN.) | DIM. A | | DIM. B | | DIM. C | | DIM. D | | DIM. E | | DIM. F | | DIM. G | | DIM. H | | DIM. J | | OCTAGON | |
|------------------------|--------|-----|--------|----|--------|-----|--------|-----|--------|----|--------|-----|--------|-----|--------|----|---------|-----|---------|-----|
| | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM | IN. | MM |
| 3/4 | 11-1/8 | 283 | 2-3/4 | 70 | 8-3/16 | 208 | 8-1/4 | 210 | 2-7/16 | 62 | 5 | 127 | 2-5/16 | 58 | 7/8 | 23 | 3-15/16 | 100 | 2-13/16 | 71 |
| 1 | 11-1/8 | 283 | 2-3/4 | 70 | 8-3/16 | 208 | 8-1/4 | 210 | 2-7/16 | 62 | 5 | 127 | 2-5/16 | 58 | 7/8 | 23 | 3-15/16 | 100 | 2-13/16 | 71 |
| 1-1/4 | 11-1/8 | 283 | 2-3/4 | 70 | 8-3/16 | 208 | 8-1/4 | 210 | 2-7/16 | 62 | 5 | 127 | 2-5/16 | 58 | 7/8 | 23 | 3-15/16 | 100 | 2-13/16 | 71 |
| 1-1/2 | 11-1/8 | 283 | 2-3/4 | 70 | 8-3/16 | 208 | 8-1/4 | 210 | 2-7/16 | 62 | 5 | 127 | 2-5/16 | 58 | 7/8 | 23 | 3-15/16 | 100 | 2-13/16 | 71 |
| 2 | 11-3/4 | 298 | 3-3/8 | 86 | 8-5/16 | 211 | 11-3/4 | 298 | 3-5/8 | 91 | 8 | 203 | 4-7/16 | 113 | 1-1/2 | 38 | 6-1/2 | 165 | 4-1/2 | 114 |
| 2-1/2 | 11-3/4 | 298 | 3-3/8 | 86 | 8-5/16 | 211 | 11-3/4 | 298 | 3-5/8 | 91 | 8 | 203 | 4-7/16 | 113 | 1-1/2 | 38 | 6-1/2 | 165 | 4-1/2 | 114 |
| 3 | 11-3/4 | 298 | 3-3/8 | 86 | 8-5/16 | 211 | 11-3/4 | 298 | 3-5/8 | 91 | 8 | 203 | 4-7/16 | 113 | 1-1/2 | 38 | 6-1/2 | 165 | 4-1/2 | 114 |

M11682A

Industrial Gas Valves

V5055/V5097 Replacement Parts or Accessories

| OS Number | Description | Used With |
|--------------|--|------------------------|
| 133393A | O-Ring Assembly for 1 in., 1 1/4 in., and 1 1/2 in. V5055/V5097 valves | V5055/V5097 valves |
| 133398AA | Replacement Bonnet Assembly with 133393A Seal Assembly for 3/4, 1, 1-1/4, 1-1/2 in. V5055A/V5097A valves | V5055/V5097 valves |
| 133398BA | Replacement Bonnet Assembly with 133393A Seal Assembly for 3/4, 1, 1-1/4, 1-1/2 in. V5055B/V5097B valves | V5055/V5097 valves |
| 133398CA | Replacement Bonnet Assembly, with 137253A replacement Seal Assembly for small body (3/4, 1, 1/1/2 in.) V5055/V5097C. | V5055/V5097 valves |
| 133417AA | Replacement Bonnet Assembly with 133392A Seal Assembly for 2, 2 1/2, and 3 in. V5055A/V5097 Large Body valves | V5055/V5097 valves |
| 133417BA | Replacement Bonnet Assembly with 133392A Seal Assembly for 2, 2 1/2, and 3 in. V5055B/V5097B Large Body valves | V5055/V5097 valves |
| 133417CA | Replacement Bonnet Assembly with 133392A Seal Assembly for 2, 2 1/2, and 3 in. V5055C/V5097C Large Body valves | V5055/V5097 valves |
| 136307AA | Replacement bonnet assembly. For large body (2, 2-1/2, 3 inch) V5055D or V5097D | V5055/V5097 valves |
| 136307BA | Replacement Bonnet Assembly with 132542 Seal Assembly for 2, 2-1/2, and 3 in. V5055E or V5097E valves | V5055/V5097 valves |
| 136308AA | Replacement Bonnet Assembly with 133393A Seal Assembly for 3/4, 1, 1-1/4, and 1-1/2 in. V5055D valves | V5055/V5097 valves |
| 136911AA | Replacement bonnet assembly. With 137253A replacement seal assembly. For 4 in. V5055A. | V5055/V5097 valves |
| 136911BA | Replacement bonnet assembly. With 137253A replacement seal assembly. For 4 in. V5055B. | V5055 |
| 136911CA | Replacement bonnet assembly. With 137253A replacement seal assembly. For 4 in. V5055C. | V5055 |
| 137253A | Replacement seal assembly. For 4 inch V5055. | V5055 |
| 32002512-001 | Large bodies 2 in.-3 in. normally open vent valve adapter. Use with V5097 | V5097 |
| 32002513-001 | Small bodies 3/4 in.-2 in. normally open vent valve adapter. Use with V5097 | V5097 |
| 32004771-001 | Integrated Valve Train Multi-tap Adapter, Small body | Integrated Valve Train |
| 32004772-001 | Integrated Valve Train Multi-tap Adapter, Large body | Integrated Valve Train |
| 32005096-001 | Screen Assembly for Multi-tap Adapter, Small body | Integrated Valve Train |
| 32005096-002 | Screen Assembly for Multi-tap Adapter, Large body | Integrated Valve Train |
| 4074EYE | Bag assembly for V5097 (large body) includes 6 each bolts, nuts and washers. | V5097 |
| 4074EYF | Bag assembly for V5097 (small body) includes 6 each bolts, nuts and washers. | V5097 |
| 4074EYK | Bag assembly for V5097 (small body) includes (2) O-rings, (1) grease capsule. | V5097 |
| 4074EYL | Bag assembly for V5097 (large body) includes (2) O-rings, (1) grease capsule. | V5097 |

V5197 Integrated Valve Train Butterfly Gas Valve

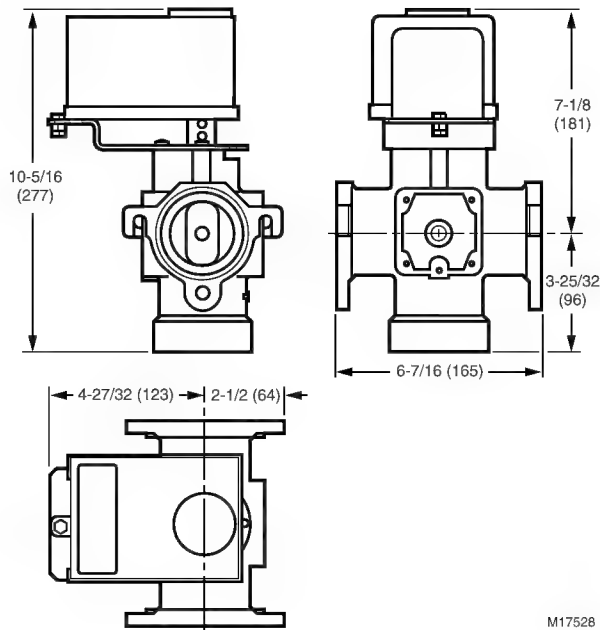


The V5197A is a firing rate valve used to provide variable flow control of air, natural gas, liquefied petroleum (LP), and manufactured gases. The V5197A is actuated by a firing rate motor that can be mounted directly on the valve. The V5197A is not applicable as a safety shutoff valve. The V5197A is specially designed to provide fine control of gas flow in applications where a high turn down ratio is required. The maximum flow adjustment screw on the bottom of the

valve allows adjusting the maximum flow of gas through the V5197 while maintaining the linear modulating characteristics and stroke. The V5197A is part of the Honeywell Integrated Valve Train System that allows gas train components to be directly bolted together.

- Used with air, natural, manufactured or liquefied petroleum (LP) gases.
- For modulating applications that do not require final shutoff service of firing rate valve.
- Two valve body types (small and large) applicable to seven pipe sizes:
- Small body type for 3/4 in. (19 mm), 1 in. (25 mm), 1-1/4 in. (32 mm), 1-1/2 in. (38 mm) and 2 in. (51 mm) pipes, NPT or ISO 7 threads.
- Large body type for 2 in. (51 mm), 2-1/2 in. (64 mm) and 3 in. (76 mm) pipes, NPT or ISO 7 threads.
- Two downstream 1/4 in. NPT threaded pressure taps available.
- Accepts C6097 Pressure Switch mounted directly to flange (downstream pressure tap only).
- Unpainted cast aluminum body.
- Suitable for electric or pneumatic operators with the appropriate linkage.
- May be used with manufacturers own linkage and drive motor.
- Flow adjustment screw on bottom of valve controls maximum flow.
- Visual position indicator.

Dimension Diagrams



M17528

Body Material: Die-cast aluminum

Temperature Ratings: -40 F to 150 F (-40 C to 66 C)

Inlet and Outlet Pressure Tapping: Two downstream 1/4 in. NPT taps

Approvals:

Canadian Standards Association: Design Certified

Industrial Risk Insurers: Acceptable

| Product Number | Type of Gas | Pipe Size | | Capacity | | Integrated Valve Train Body Size | Mounting | Pressure Ratings | |
|----------------|------------------------------------|-----------|-------|--------------------------|--------------------|----------------------------------|--|------------------|-------|
| | | (inch) | (mm) | cfh | m ³ /hr | | | (psi) | (kPa) |
| V5197A1003 | Air, natural, manufactured, and LP | 3/4 in. | 19 mm | 3570 cfh for 3/4 in. | 19 mm =101 | Small body | Directly bolted to Integrated Valve Train (IVT) components or IVT adapters | 15 psi max | 1 Bar |
| | | 1 in. | 25 mm | 4500 cfh for 1 in. | 25 mm =127 | | | | |
| | | 1 1/4 in. | 32 mm | 6470 cfh for 1 1/4 in. | 32 mm = 183 | | | | |
| | | 1 1/2 in. | 38mm | 7310 cfh for 1 1/2 in. | 38 mm =207 | | | | |
| | | 2 in. | 51 mm | 8000 cfh for 2 in. | 51 mm =226 | | | | |
| V5197A1011 | Air, natural, manufactured, and LP | 2 in. | 51 mm | 12,600 cfh for 2 in. | 51 mm=356 | Large body | Directly bolted to Integrated Valve Train (IVT) components or IVT adapters | 15 psi max | 1 Bar |
| | | 2 1/2 in. | 64 mm | 14,800 cfh for 2 1/2 in. | 64 mm=419 | | | | |
| | | 3 in. | 76 mm | 16,900 cfh for 3 in. | 76 mm=478 | | | | |

Integrated Valve Train

V4297 Assembled Valve Train

Integrated Valve Train Body Size: Small
Pipe Thread: NPT

| Product Number | Pipe size (in.) | Pipe Thread | First Adapter | First Valve | Vent Valve | Vent Pipe Forward or Backward | Second Valve | Second Adapter |
|----------------|-----------------|-------------|---------------|-------------|------------|-------------------------------|--------------|----------------|
| VAAHHXA1108 | 3/4 in. | NPT | 32000109-001 | V4297A1005 | None | NA | V4297A1005 | 32000109-001 |
| VABHAXB1004 | 1 in. | NPT | 32000109-002 | V4297A1005 | None | NA | V5097A1004 | 32000109-002 |
| VABHHXB1106 | 1 in. | NPT | 32000109-002 | V4297A1005 | None | NA | V4297A1005 | 32000109-002 |
| VACHAXC1002 | 1 1/4 in. | NPT | 32000109-003 | V4297A1005 | None | NA | V5097A1004 | 32000109-003 |
| VACHHXC1104 | 1 1/4 in. | NPT | 32000109-003 | V4297A1005 | None | NA | V4297A1005 | 32000109-003 |
| VADHAXD1000 | 1 1/2 in. | NPT | 32000109-004 | V4297A1005 | None | NA | V5097A1004 | 32000109-004 |
| VADJCXD1102 | 1 1/2 in. | NPT | 32000109-004 | V4297A1013 | None | NA | V5097C1000 | 32000109-004 |
| VADJJXD1104 | 1 1/2 in. | NPT | 32000109-004 | V4297A1013 | None | NA | V4297A1013 | 32000109-004 |
| VAEJCXE1100 | 2 in. | NPT | 32000109-005 | V4297A1013 | None | NA | V5097C1000 | 32000109-005 |
| VAEJJXE1102 | 2 in. | NPT | 32000109-005 | V4297A1013 | None | NA | V4297A1013 | 32000109-005 |
| VBCHAXC1000 | 1 1/4 in. | NPT | 32000109-003 | V4297A1005 | V4297S1003 | Forward | V5097A1004 | 32000109-003 |

V5097 Assembled Valve Train

Pipe Thread: NPT

| Product Number | Pipe size (in.) | Integrated Valve Train Body Size | First Adapter | First Valve | Vent Valve | Vent Pipe Forward or Backward | Second Valve | Second Adapter |
|----------------|-----------------|----------------------------------|---------------|-------------|------------|-------------------------------|--------------|----------------|
| VABAAXB1009 | 1 in. | Small | 32000109-002 | V5097A1004 | None | NA | V5097A1004 | 32000109-002 |
| VACAAXC1007 | 1 1/4 in. | Small | 32000109-003 | V5097A1004 | None | NA | V5097A1004 | 32000109-003 |
| VADAAXD1005 | 1 1/2 in. | Small | 32000109-004 | V5097A1004 | None | NA | V5097A1004 | 32000109-004 |
| VADBAXD1003 | 1 1/2 in. | Small | 32000109-004 | V5097B1002 | None | NA | V5097A1004 | 32000109-004 |
| VAEAAXE1003 | 2 in. | Small | 32000109-005 | V5097A1004 | None | NA | V5097A1004 | 32000109-005 |
| VAEACXE1001 | 2 in. | Small | 32000109-005 | V5097A1004 | None | NA | V5097C1000 | 32000109-005 |
| VBBAAXB1007 | 1 in. | Small | 32000109-002 | V5097A1004 | V4297S1003 | Forward | V5097A1004 | 32000109-002 |
| VBBACXB1005 | 1 in. | Small | 32000109-002 | V5097A1004 | V4297S1003 | Forward | V5097C1000 | 32000109-002 |
| VBDAAXD1003 | 1 1/2 in. | Small | 32000109-004 | V5097A1004 | V4297S1003 | Forward | V5097A1004 | 32000109-004 |
| VBDACXD1001 | 1 1/2 in. | Small | 32000109-004 | V5097A1004 | V4297S1003 | Forward | V5097C1000 | 32000109-004 |
| VBAAAXE1001 | 2 in. | Small | 32000109-005 | V5097A1004 | V4297S1003 | Forward | V5097A1004 | 32000109-005 |
| VBEACXE1009 | 2 in. | Small | 32000109-005 | V5097A1004 | V4297S1003 | Forward | V5097C1000 | 32000109-005 |
| VCBAAXB1005 | 1 in. | Small | 32000109-002 | V5097A1004 | V4297S1003 | Backward | V5097A1004 | 32000109-002 |
| VCBACXB1003 | 1 in. | Small | 32000109-002 | V5097A1004 | V4297S1003 | Backward | V5097C1000 | 32000109-002 |
| VCCAAXC1003 | 1 1/4 in. | Small | 32000109-003 | V5097A1004 | V4297S1003 | Backward | V5097A1004 | 32000109-003 |
| VCDAAAXD1001 | 1 1/2 in. | Small | 32000109-004 | V5097A1004 | V4297S1003 | Backward | V5097A1004 | 32000109-004 |
| VCDACXD1009 | 1 1/2 in. | Small | 32000109-004 | V5097A1004 | V4297S1003 | Backward | V5097C1000 | 32000109-004 |
| VCDBAXD1009 | 1 1/2 in. | Small | 32000109-004 | V5097B1002 | V4297S1003 | Backward | V5097A1004 | 32000109-004 |
| VCDCCXD1005 | 1 1/2 in. | Small | 32000109-004 | V5097C1000 | V4297S1003 | Backward | V5097C1000 | 32000109-004 |
| VCEAAAXE1009 | 2 in. | Small | 32000109-005 | V5097A1004 | V4297S1003 | Backward | V5097A1004 | 32000109-005 |
| VCEACXE1007 | 2 in. | Small | 32000109-005 | V5097A1004 | V4297S1003 | Backward | V5097C1000 | 32000109-005 |
| VDFAAAXF1005 | 2 in. | Large | 32001605-001 | V5097A1012 | None | NA | V5097A1012 | 32001605-001 |
| VDFACXF1003 | 2 in. | Large | 32001605-001 | V5097A1012 | None | NA | V5097C1000 | 32001605-001 |
| VDGAAXG1003 | 2-1/2 in. | Large | 32001605-002 | V5097A1012 | None | NA | V5097A1012 | 32001605-002 |
| VDGACXG1001 | 2-1/2 in. | Large | 32001605-002 | V5097A1012 | None | NA | V5097C1000 | 32001605-002 |
| VDHAAXH1001 | 3 in. | Large | 32001605-003 | V5097A1012 | None | NA | V5097A1012 | 32001605-003 |
| VDHACXH1009 | 3 in. | Large | 32001605-003 | V5097A1012 | None | NA | V5097C1018 | 32001605-003 |

Products are available through authorized Honeywell distributors

Integrated Valve Train

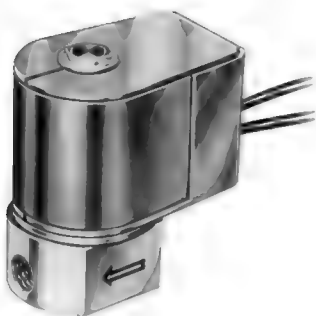
| Product Number | Pipe size (in.) | Integrated Valve Train Body Size | First Adapter | First Valve | Vent Valve | Vent Pipe Forward or Backward | Second Valve | Second Adapter |
|----------------|-----------------|----------------------------------|---------------|-------------|------------|-------------------------------|--------------|----------------|
| VEFAAXF1002 | 2 in. | Large | 32001605-001 | V5097A1012 | V4297S1011 | Forward | V5097A1012 | 32001605-001 |
| VEFACXF1000 | 2 in. | Large | 32001605-001 | V5097A1012 | V4297S1011 | Forward | V5097C1018 | 32001605-001 |
| VEGACXG1008 | 2-1/2 in. | Large | 32001605-002 | V5097A1012 | V4297S1011 | Forward | V5097C1018 | 32001605-002 |
| VEGCCXG1004 | 2-1/2 in. | Large | 32001605-002 | V5097C1018 | V4297S1011 | Forward | V5097C1018 | 32001605-002 |
| VEHACXH1006 | 3 in. | Large | 32001605-003 | V5097A1012 | V4297S1011 | Forward | V5097C1018 | 32001605-003 |
| VFFAAXF1000 | 2 in. | Large | 32001605-001 | V5097A1012 | V4297S1011 | Backward | V5097A1012 | 32001605-001 |
| VFFCCXF1004 | 2 in. | Large | 32001605-001 | V5097C1018 | V4297S1011 | Backward | V5097C1018 | 32001605-001 |
| VFGAAXG1008 | 2-1/2 in. | Large | 32001605-002 | V5097A1012 | V4297S1011 | Backward | V5097A1012 | 32001605-002 |
| VFHAAXH1006 | 3 in. | Large | 32001605-003 | V5097A1012 | V4297S1011 | Backward | V5097A1012 | 32001605-003 |

Integrated Valve Train Pipe Adapter

| Product Number | Pipe size (in.) | Pipe Thread | Integrated Valve Train Body Size | Description |
|----------------|-----------------|-------------|----------------------------------|---|
| 32000109-001 | 3/4 in. | NPT | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-002 | 1 in. | NPT | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-003 | 1 1/4 in. | NPT | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-004 | 1 1/2 in. | NPT | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-005 | 2 in. | NPT | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-006 | 3/4 in. | BSP | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-007 | 1 in. | BSP | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-008 | 1 1/4 in. | BSP | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-009 | 1 1/2 in. | BSP | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32000109-010 | 2 in. | BSP | Small body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32001605-001 | 2 in. | NPT | Large body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32001605-002 | 2 1/2 in. | NPT | Large body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32001605-003 | 3 in. | NPT | Large body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32001605-004 | 2 in. | BSP | Large body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32001605-005 | 2 1/2 in. | BSP | Large body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |
| 32001605-006 | 3 in. | BSP | Large body | Pipe Adapter Integrated Valve Train. Required for Valve Train Assembly. |

Solenoid Gas Valves

V4046C; V8046C Pilot Gas Valves



Provide on-off control of natural, LP and manufactured gases to pilot burners in industrial and commercial applications.

- Magnetically operated, normally closed.
- Provide instantaneous action when energized.
- On power failure, valve closes in one second maximum.
- Use in any position, directly in pipe line or on support bracket.
- Replace the solenoid coil without removing the valve body from the piping connections.
- Straight-through valve pattern.
- Available in line voltage or low voltage models.

Type of Gas: Air, natural, manufactured, and LP

Dimensions, Approximate: 2 3/4 in. high, 2 5/8 in. wide, 1 5/8 in. deep
(70 mm high, 67 mm wide, 41 mm deep)

Valve pattern: Straight-through

Power Consumption: 8W maximum at rated voltage (14 VA)

Frequency: 50 Hz, 60 Hz

Mounting Type: Directly in pipe or on support bracket

Temperature Ratings: -40 F to 125 F (-40 C to 52 C)

Pressure Ratings: 10 psi (13.8 kPa)

Valve Closing Time (sec): 1 sec max

Valve Opening Time: 1 sec max

Approvals:

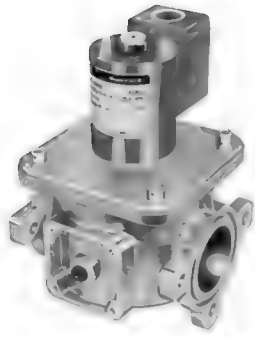
Canadian Standards Association: Certificate No. 158158-2500006058, Guide No. C3371-03, 83

Factory Mutual: Straight-through

Industrial Risk Insurers: Underwriters Laboratories, Inc: Listed: File No. MH1639, V3, S3 - Guide No. YIOZ

| Product Number | Pipe size | | Capacity | | Power (Vac) | Electrical Terminations |
|----------------|-----------|------|----------|-------------------------|------------------|--|
| | (inch) | (mm) | cfh | m ³ /hr | | |
| V4046C1005 | 1/8 in. | 3 mm | 20 cfh | 0.57 m ³ /hr | 110 Vac, 120 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V4046C1021 | 1/4 in. | 6 mm | 20 cfh | 0.57 m ³ /hr | 110 Vac, 120 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V4046C1047 | 1/4 in. | 6 mm | 55 cfh | 1.56 m ³ /hr | 110 Vac, 120 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V4046C1054 | 3/8 in. | 9 mm | 67 cfh | 1.90 m ³ /hr | 110 Vac, 120 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V4046C1088 | 3/8 in. | 9 mm | 67 cfh | 1.90 m ³ /hr | 208 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V4046C1120 | 3/8 in. | 9 mm | 67 cfh | 1.90 m ³ /hr | 120 Vac | Two 10 ft. leadwires and 1/2 in. conduit bushing |
| V8046C1006 | 1/8 in. | 3 mm | 20 cfh | 0.57 m ³ /hr | 24 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V8046C1014 | 1/4 in. | 6 mm | 20 cfh | 0.57 m ³ /hr | 24 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V8046C1022 | 1/4 in. | 6 mm | 55 cfh | 1.56 m ³ /hr | 24 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |
| V8046C1030 | 3/8 in. | 9 mm | 67 cfh | 1.90 m ³ /hr | 24 Vac | Two 36-in. leadwires and 1/2 in. conduit bushing |

V4297A Solenoid Safety Shut-off Valve



Type of Gas: Air, natural, manufactured, mixed, and LP
Dimensions, Approximate: 9 in. high, 5 3/4 in. wide, 5 5/8 in. deep
 (229 mm high, 147 mm wide, 143 mm deep)
Valve pattern: Straight-through, non-offset
Electrical Connections: Screw terminals
Frequency: 50 Hz, 60 Hz
Power (Vac): 110 Vac, 120 Vac
Inlet and Outlet Pressure Tapping: 1/4 in. NPT
Mounting Type: Directly bolted to Integrated Valve Train Components
Temperature Ratings: -40 F to 130 F (-40 C to 54 C)
Pressure Ratings: 5 psi (34.5 kPa)

V4295A are normally closed and V4295S are normally open (vent) solenoid gas valve. Suitable for use on furnaces, ovens, atmospheric burners, commercial water heaters, roof-top make-up air units, power burners, and commercial/ industrial boilers.

- V4295A,S are used with 120 Vac controllers.
- Positive close off of gas flow when de-energized.
- High valve spring force allows up to 0.7 psi back pressure at valve seat.
- No inlet pressure influence at valve seat. Inlet pressure changes do not affect ability to close valve.
- Low operating noise.
- Low rush-in current.
- Upstream and downstream taps allows tapping and testing pressure points.
- For use with the Integrated Valve Train.

Valve Closing Time (sec): less than 1 sec

Valve Opening Time: less than 1 sec

Approvals:

Canadian Standards Association: Certificate No. 158158-1154280, Guide No. C3371-03, 04, 83

Factory Mutual: Straight-through, non-offset

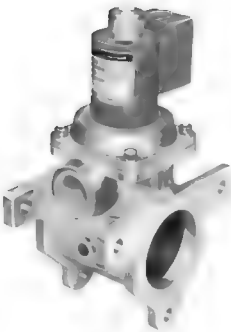
Underwriters Laboratories, Inc: Listed: File No. MH18476, V1, S1 - Guide No. YIOZ

Accessories:

See table on page 99

| Product Number | Pipe size | | Capacity | | Flanges | Current (max amps at rated Vac/Hz) | Integrated Valve Train Body Size | Replacement Parts |
|----------------|---|----------------|--|---|----------------------------|------------------------------------|----------------------------------|------------------------|
| | (inch) | (mm) | cfh | m ³ /hr | | | | |
| V4297A1005 | 3/4 in. 1 in. 1 1/4 in. | 19 mm to 32 mm | 650 cfh 700 cfh 780 cfh | 18.4 m ³ /hr 19.8 m ³ /hr 22.1 m ³ /hr | Required, Order Separately | 0.2 amps | Small body, small flow | BBA51315 Coil Assembly |
| V4297A1013 | 3/4 in. 1 in. 1 1/4 in. 1 1/2 in. 2 in. | 19 mm to 51 mm | 1190 cfh 1460 cfh 2260 cfh 2735 cfh 3060 cfh | 33.7 m ³ /hr 41.3 m ³ /hr 64.0 m ³ /hr 77.4 m ³ /hr 86.6 m ³ /hr | Required, Order Separately | 0.5 amps | Small body, large flow | BBA51318 Coil Assembly |

V4297S Normally Open Vent Valve



Type of Gas: Air, natural, manufactured, mixed, and LP
Dimensions, Approximate: 9 1/2 in. high, 3 1/8 in. wide, 5 in. deep
 (241 mm high, 79 mm wide, 127 mm deep)

Valve pattern: Straight-through, non-offset

Electrical Connections: Screw terminals

Frequency: 50 Hz, 60 Hz

Power (Vac): 110 Vac, 120 Vac

Inlet and Outlet Pressure Tapping: 1/4 in. NPT

Mounting Type: Directly bolted to Integrated Valve Train Components

Temperature Ratings: -40 F to 145 F (-40 C to 63 C)

Pressure Ratings: 5 psi (34.5 kPa)

Valve Closing Time (sec): less than 1 sec

Valve Opening Time: less than 1 sec

Approvals:

Canadian Standards Association: Certificate No. 158158-1154280, Guide No. C3371-03, 04, 83

Factory Mutual: Straight-through, non-offset

Underwriters Laboratories, Inc: Listed: File No. MH18476, V1, S1 - Guide No. YIOZ

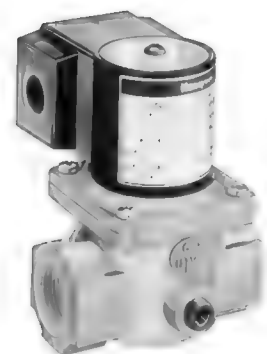
Accessories:

See table on page 99

| Product Number | Pipe size | | Capacity | | Flanges | Current (max amps at rated Vac/Hz) | Integrated Valve Train Body Size | Replacement Parts |
|----------------|-----------|-------|----------|-------------------------|----------|------------------------------------|----------------------------------|------------------------|
| | (inch) | (mm) | cfh | m ³ /hr | | | | |
| V4297S1003 | 1 in. | 25 mm | 714 cfh | 20.2 m ³ /hr | Required | 0.2 amps | Small body | BBA51316 Coil Assembly |
| V4297S1011 | 1 1/4 in. | 32 mm | 1115 cfh | 31.6 m ³ /hr | Required | 0.34 amps | Large body | BBA51317 Coil Assembly |

Solenoid Gas Valves

V4295; V8295 Solenoid Gas Valves



Type of Gas: Air, natural, manufactured, mixed, and LP
Dimensions, Approximate: 4 7/16 in. high, 2 7/8 in. wide, 2 3/16 deep
 (113 mm high, 73 mm wide, 56 mm deep)
Valve pattern: Straight-through, non-offset
Electrical Connections: Screw terminals
Frequency: 50 Hz, 60 Hz
Inlet and Outlet Pressure Tapping: 1/4 in. NPT
Mounting Type: Vertical to 90 degrees from vertical
Temperature Ratings: -40 F to 140 F (-40 C to 60 C)
Pressure Ratings: 2 psi (13.8 kPa)
Valve Closing Time (sec): less than 1 sec

V4295A/V8295A are normally closed and V4295S/V8295S are normally open (vent) solenoid gas valve. Suitable for use on furnaces, ovens, atmospheric burners, commercial water heaters, roof-top make-up air units, power burners, and commercial/ industrial boilers.

- V4295A,S are used with 120 Vac controllers.
- V8295A,S are used with 24 Vac controllers.
- Positive close off of gas flow when de-energized.
- High valve spring force allows up to 0.7 psi back pressure at valve seat.
- No inlet pressure influence at valve seat. Inlet pressure changes do not affect ability to close valve.
- Low operating noise.
- Low rush-in current.
- Upstream and downstream taps allows tapping and testing pressure points.

Valve Opening Time: less than 1 sec

Approvals:

Canadian Standards Association: Certificate No. 158158-1154280, Guide No. C3371-03, 04, 83

Factory Mutual: Straight-through, non-offset

Underwriters Laboratories, Inc: Listed: File No. MH18476, V1, S1 - Guide No. YIOZ

Accessories:

See table on page 99

| Product Number | Pipe size | | Capacity | | Current (max amps at rated Vac/Hz) | Replacement Parts | Power (Vac) |
|----------------|-----------|-------|----------|--------------------------|------------------------------------|------------------------|-------------|
| | (Inch) | (mm) | cfh | m ³ /hr | | | |
| V4295A1007 | 3/8 in. | 9 mm | 230 cfh | 6.5 m ³ /hr | 0.160 amps | BBA51302 Coil Assembly | 120 Vac |
| V4295A1015 | 1/2 in. | 13 mm | 250 cfh | 7.1 m ³ /hr | 0.160 amps | BBA51302 Coil Assembly | 120 Vac |
| V4295A1023 | 3/4 in. | 19 mm | 645 cfh | 18.3 m ³ /hr | 0.160 amps | BBA51302 Coil Assembly | 120 Vac |
| V4295A1031 | 1 in. | 25 mm | 790 cfh | 22.4 m ³ /hr | 0.160 amps | BBA51302 Coil Assembly | 120 Vac |
| V4295A1049 | 1 1/4 in. | 32 mm | 1450 cfh | 41.0 m ³ /hr | 0.340 amps | BBA51303 Coil Assembly | 120 Vac |
| V4295A1056 | 1 1/2 in. | 38 mm | 2190 cfh | 62.0 m ³ /hr | 0.300 amps | BBA51301 Coil Assembly | 120 Vac |
| V4295A1064 | 2 in. | 51 mm | 3465 cfh | 98.1 m ³ /hr | 0.525 amps | BBA51304 Coil Assembly | 120 Vac |
| V4295A1072 | 2-1/2 in. | 64 mm | 5070 cfh | 143.5 m ³ /hr | 0.575 amps | BBA51305 Coil Assembly | 120 Vac |
| V4295A1080 | 3 in. | 76 mm | 6100 cfh | 172.7 m ³ /hr | 0.675 amps | BBA51306 Coil Assembly | 120 Vac |
| V4295A1098 | 3/8 in. | 9 mm | 210 cfh | 5.9 m ³ /hr | 0.160 amps | BBA51302 Coil Assembly | 120 Vac |
| V4295A1106 | 1/2 in. | 13 mm | 290 cfh | 8.2 m ³ /hr | 0.160 amps | BBA51302 Coil Assembly | 120 Vac |
| V4295A1114 | 3/4 in. | 19 mm | 610 cfh | 17.3 m ³ /hr | 0.2 amps | BBA51314 Coil Assembly | 120 Vac |
| V4295A1122 | 1 in. | 25 mm | 825 cfh | 23.4 m ³ /hr | 0.2 amps | BBA51309 Coil Assembly | 120 Vac |
| V4295A1130 | 1 1/4 in. | 32 mm | 1950 cfh | 55.2 m ³ /hr | 0.550 amps | BBA51310 Coil Assembly | 120 Vac |
| V4295A1148 | 1 1/2 in. | 38 mm | 2270 cfh | 64.3 m ³ /hr | 0.550 amps | BBA51310 Coil Assembly | 120 Vac |
| V4295A1155 | 2 in. | 51 mm | 3740 cfh | 105.9 m ³ /hr | 0.540 amps | BBA51311 Coil Assembly | 120 Vac |
| V4295S1005 | 3/4 in. | 19 mm | 350 cfh | 9.9 m ³ /hr | 0.160 amps | BBA51307 Coil Assembly | 120 Vac |
| V4295S1013 | 1 in. | 25 mm | 420 cfh | 11.9 m ³ /hr | 0.160 amps | BBA51307 Coil Assembly | 120 Vac |
| V4295S1021 | 1 1/4 in. | 32 mm | 1100 cfh | 31.1 m ³ /hr | 0.340 amps | BBA51308 Coil Assembly | 120 Vac |
| V8295A1008 | 3/8 in. | 9 mm | 230 cfh | 6.5 m ³ /hr | 0.8 amps | BBA52402 Coil Assembly | 24 Vac |
| V8295A1016 | 1/2 in. | 13 mm | 250 cfh | 7.1 m ³ /hr | 0.8 amps | BBA52402 Coil Assembly | 24 Vac |
| V8295A1024 | 3/4 in. | 19 mm | 645 cfh | 18.3 m ³ /hr | 0.8 amps | BBA52402 Coil Assembly | 24 Vac |
| V8295A1032 | 1 in. | 25 mm | 790 cfh | 22.4 m ³ /hr | 0.8 amps | BBA52402 Coil Assembly | 24 Vac |

Solenoid Gas Valves

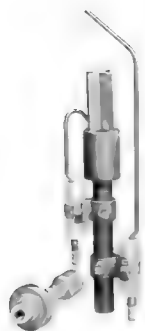
| Product Number | Pipe size | | Capacity | | Current (max amps at rated Vac/Hz) | Replacement Parts | Power (Vac) |
|----------------|-----------|-------|----------|--------------------------|------------------------------------|-------------------------|-------------|
| | (inch) | (mm) | cfh | m ³ /hr | | | |
| V8295A1040 | 1 1/4 in. | 32 mm | 1450 cfh | 41.0 m ³ /hr | 0.8 amps | BBA52403 Coil Assembly | 24 Vac |
| V8295A1057 | 1 1/2 in. | 38 mm | 2190 cfh | 62.0 m ³ /hr | 0.8 amps | BBA52401 Coil Assembly | 24 Vac |
| V8295A1065 | 2 in. | 51 mm | 3465 cfh | 98.1 m ³ /hr | 0.8 amps | BBA52404 Coil Assembly | 24 Vac |
| V8295S1006 | 3/4 in. | 19 mm | 350 cfh | 143.5 m ³ /hr | 0.8 amps | BBA52407 Coil Assembly | 24 Vac |
| V8295S1014 | 1 in. | 25 mm | 420 cfh | 172.7 m ³ /hr | 0.8 amps | BBA52407 Coil Assembly | 24 Vac |
| V8295S1022 | 1 1/4 in. | 32 mm | 1100 cfh | — | 0.8 amps | BBA524078 Coil Assembly | 24 Vac |

Solenoid Gas Valve Replacement Parts or Accessories

| OS Number | Description | Used With |
|--------------|---|-----------|
| 116668A | Replacement Coil Assembly for 24V, 60 Hz V8046 | V8046 |
| 116670A | Replacement Coil Assembly for 240V, 60 Hz V4046 | V4046 |
| 116671A | Replacement Coil Assembly for 120V, 60 Hz V4046 | V4046 |
| 116782A | Replacement Coil Assembly for 208V, 60 Hz V4046C | V4046C |
| BBA51301 | Replacement Coil for 1 1/2 inch, 2 psi V4295 normally closed valve, 120 Vac | V4297 |
| BBA51302 | Replacement Coil for 3/8 inch, 1/2 inch, 3/4 inch, 1 inch, 2 psi; 3/8 inch, 1/2 inch 5 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51303 | Replacement Coil for 1 1/4 inch, 2 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51304 | Replacement Coil for 2 inch, 2 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51305 | Replacement Coil for 2 1/2 inch, 2 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51306 | Replacement Coil for 3 inch, 2 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51307 | Replacement Coil for 3/4 inch, 1 inch, 2 psi V4295 normally open (vent) valve, 120 Vac | V4295 |
| BBA51308 | Replacement Coil for 1 1/4 inch, 2 psi V4295 normally open (vent) valve, 120 Vac | V4295 |
| BBA51309 | Replacement Coil for 1 inch, 5 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51310 | Replacement Coil for 1 1/4 inch, 1 1/2 inch 5 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51311 | Replacement Coil for 2 inch, 5 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51314 | Replacement Coil for 3/4 inch, 5 psi V4295 normally closed valve, 120 Vac | V4295 |
| BBA51315 | Replacement Coil for V4297A1005, small flow, 120 Vac | V4295 |
| BBA51316 | Replacement Coil for V4297S small body, vent valve, 120 Vac | V4297 |
| BBA51317 | Replacement Coil for V4297S large body, vent valve, 120 Vac | V4297 |
| BBA51318 | Replacement Coil for V4297A1013, large flow, 120 Vac | V4297 |
| BBA52401 | Replacement Coil for 1 1/2 inch, 2 psi V8295 normally closed valve, 24 Vac | V4297 |
| BBA52402 | Replacement Coil for 3/8 inch, 1/2 inch, 3/4 inch, 1 inch, 2 psi V8295 normally closed valve, 24 Vac | V8295 |
| BBA52403 | Replacement Coil for 1 1/4 inch, 2 psi V8295 normally closed valve, 24 Vac | V8295 |
| BBA52404 | Replacement Coil for 2 inch, 2 psi V8295 normally closed valve, 24 Vac | V8295 |
| BBA52407 | Replacement Coil for 3/4 inch, 1 inch, 2 psi V8295 normally open (vent) valve, 24 Vac | V8295 |
| BBA52408 | Replacement Coil for 1 1/4 inch, 2 psi V8295 normally open (vent) valve, 24 Vac | V8295 |
| 32004925-001 | Closed Position Indicator (CPI) switch. Used with V4297A | V8295 |
| KTCPI001 | Visual indication for V4297A | V4297 |

Pilot Burners

C7005 Flame Rectifier Pilots



Dimensions, Approximate: 3 in. diameter, 3 1/2 in. deep
(76 mm diameter, 343 mm deep.)

Application: For Continuous (Standing) pilot.

Gas Fitting: 1/2 in. NPT male thread

Combination rectification flame rod and pilot burner for use with suitable relay on industrial or commercial gas or gas pilot-ignited oil burners.

- Models available for use with natural or LP gas.
- Provide maximum flame current with flame-retention type pilot head and bomb type fins.
- Mount in vertical, horizontal or inclined position.

Approvals:

Canadian Standards Association Certified: File No. LR1620, Guide No. 140-A-2

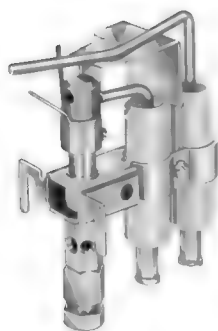
Factory Mutual: Approved: Report No. 24181.04

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc. Listed: File No. MP268, Guide No. MCCZ

| Product Number | Type of Gas | Orifice | Description | Includes | Used With |
|----------------|-------------|----------------|-----------------------|--------------------|--|
| C7005A1037 | Natural | 0.052 in. dia. | Flame Rectifier Pilot | — | |
| C7005B1035 | Natural | 0.052 in. dia. | Flame Rectifier Pilot | Ignition electrode | Q624 or other suitable ignition transformer. |
| C7005B1050 | LP | 0.028 in. dia. | Flame Rectifier Pilot | Ignition electrode | Q624 or other suitable ignition transformer. |

Q179A,B Flame Rectifier Gas Pilots



Dimensions, Approximate: 4 5/8 in. high, 1 11/16 in. wide, 3 in. deep
(118 mm high, 43 mm wide, 76 mm deep)

Application: For Intermittent or Interrupted Ignition.

Gas Fitting: 1/4 in. compression coupling
(6.4 mm compression coupling)

Approvals:

Combination rectifying flame rod and pilot burner for use with suitable

- Side or end mounting bracket.
- Include natural gas orifice; order 47540 Orifice Assembly for LP gas.
- Include compression coupling for 1/4 in. (6.4 mm) O.D. tubing.
- Primary-aerated type burner is equipped with stainless steel fins to stabilize flame and provide correct flame rod area to ground area ratio for maximum flame current.
- Uses Rajah electrical connectors.

Canadian Standards Association: Certified: File No. LR1620, Guide No. 140-A-2

Factory Mutual: Approved: Report No. 22961

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc. Listed: File No. MP268, Guide No. MCCZ

| Product Number | Type of Gas | Gas Consumption | Orifice | Mounting Bracket | Port and Burner Tip Style | Includes | Used With |
|----------------|-------------|-------------------------|-----------------------------------|------------------|---------------------------|--|--|
| Q179A1001 | Natural | 2.0 cfh (0.06 m3/hr) | 0.025 in. dia. (0.635 mm dia.) | side/end | I | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179A1035 | Natural | 2.0 cfh (0.06 m3/hr) | 0.025 in. dia. (0.635 mm dia.) | side/end | 45 degree right hand | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179A1050 | Natural | 2.0 cfh (0.06 m3/hr) | 0.028 in. dia. (0.711 mm dia.) | side/end | T | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179A1076 | Natural | 2.0 cfh (0.06 m3/hr) | 0.028 in. dia. (0.711 mm dia.) | side/end | 45 degree Y | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179A1092 | Natural | 2.0 cfh (0.06 m3/hr) | 0.028 in. dia. (0.711 mm dia.) | side/end | 45 degree T | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |

| Product Number | Type of Gas | Gas Consumption | Orifice | Mounting Bracket | Port and Burner Tip Style | Includes | Used With |
|----------------|-------------|-----------------------------------|--------------------------------|------------------|---------------------------|--|--|
| Q179A1118 | Natural | 2.0 cfh (0.06 m ³ /hr) | 0.025 in. dia. (0.635 mm dia.) | side/end | 45 degree left hand | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179A1126 | Natural | 2.0 cfh (0.06 m ³ /hr) | 0.025 in. dia. (0.635 mm dia.) | side/end | I | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179B1042 | Natural | 2.0 cfh (0.06 m ³ /hr) | 0.025 in. dia. (0.635 mm dia.) | side/end | T | Flame electrode | |
| Q179B1117 | Natural | 2.0 cfh (0.06 m ³ /hr) | 0.025 in. dia. (0.635 mm dia.) | side/end | 45 degree I | Flame electrode | |

Q179C,D Miniature Rectifier Pilots



Dimensions, Approximate: 3 1/8 in. high, 2 7/16 in. wide, 1 in. deep (79 mm high, 62 mm wide, 25 mm deep)

Application: For Intermittent or Interrupted Ignition.

Gas Fitting: 1/4 in. compression coupling (6.4 mm compression coupling)

Approvals:

Gas pilot burner assemblies prove pilot flame on industrial or commercial gas burners or gas pilot-ignited oil burners.

- Replace Q179A and B.
- Side or end mounting bracket
- Include natural gas orifice. Order 388146KD Orifice Assembly for LP gas.
- Include compression coupling for 1/4 in. (6.4 mm) O.D. tubing.
- Primary-aerated type burner is equipped with stainless steel target to stabilize flame and provide correct flame rod area to ground area ratio for maximum flame current.
- Use Rajah electrical connectors.

Canadian Standards Association: Certified: Master Report LR95329-1

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc. Component Recognized: File No. MH9928, Guide No. MCUR2

| Product Number | Type of Gas | Orifice | Mounting Bracket | Target Mount | Port and Burner Tip Style | Includes | Used With |
|----------------|-------------|--------------------------------|------------------|------------------------|---------------------------|--|--|
| Q179C1009 | Natural | 0.026 inch dia. (0.66 mm dia.) | rear | Dual Wing-Rear | D | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179C1025 | Natural | 0.024 inch dia. (0.60 mm dia.) | rear | Single Wing-Rear | L | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179C1033 | Natural | 0.026 inch dia. (0.66 mm dia.) | left side | Dual Wing- Left Side | D | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179C1041 | Natural | 0.026 inch dia. (0.66 mm dia.) | right side | Dual Wing-Right Side | D | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179C1058 | Natural | 0.024 inch dia. (0.60 mm dia.) | left side | Single Wing-Left Side | L | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179C1066 | Natural | 0.024 inch dia. (0.60 mm dia.) | right side | Single Wing-Right Side | K | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179C1090 | LP | 0.016 inch dia. (0.40 mm dia.) | rear | Dual Wing-Rear | D | Flame electrode and ignition electrode | Q624 or other suitable ignition transformer. |
| Q179D1008 | Natural | 0.026 inch dia. (0.66 mm dia.) | rear | Dual Wing-Rear | D | Flame electrode and thermocouple adapter | Q340 Thermocouple or Q313A Thermopile Generator. |
| Q179D1016 | Natural | 0.026 inch dia. (0.66 mm dia.) | left side | Dual Wing- Left Side | D | Flame electrode and thermocouple adapter | Q340 Thermocouple or Q313A Thermopile Generator. |
| Q179D1024 | Natural | 0.026 inch dia. (0.66 mm dia.) | right side | Dual Wing-Right Side | D | Flame electrode and thermocouple adapter | Q340 Thermocouple or Q313A Thermopile Generator. |
| Q179D1032 | Natural | 0.026 inch dia. (0.66 mm dia.) | rear | Dual Wing-Rear-2 inch | D | Flame electrode and thermocouple adapter | Q340 Thermocouple or Q313A Thermopile Generator. |
| Q179D1057 | Natural | 0.024 inch dia. (0.60 mm dia.) | left side | Single Wing-Left Side | L | Flame electrode and thermocouple adapter | Q340 Thermocouple or Q313A Thermopile Generator. |
| Q179D1925 | LP | 0.016 inch dia. (0.40 mm dia.) | rear | Dual Wing-Rear | D | Flame electrode and thermocouple adapter | Q340 Thermocouple or Q313A Thermopile Generator. |

Products are available through authorized Honeywell distributors

Pilot Burners

Parts or Accessories for Pilot Burners for Flame Safeguard Products

| OS Number | Description | Used With |
|-------------|--|-----------------------------|
| 101738 | Insulator for Flame rod or Ignitor, C7005A, B | C7005A, C7005B |
| 101739 | Ignition Electrode, 4 inch, Stainless Steel, C7005A, B | C7005A, C7005B |
| 101743 | Mounting Bracket, C7005A, B | C7005A, C7005B |
| 102462 | Adapts Q340 Thermal Couple to Q179B w/131065 | C7005B, Q179B, Q340 |
| 103534 | Kanthal Flame Electrode for C7005A, B | Q340, C7005A, C7005B |
| 104312 | Rajah Connector for Flame Electrode, Q179A, B | C7005B, Q179A, Q179B |
| 131065 | Adapts Q340 Thermal Couple to Q179B w/102462 | Q179A, Q179B |
| 133453 | Insulator for Q179A, B | Q179A, Q179B |
| 100204B | Natural Gas Venturi Mixing Tube for C7005A and C7005B | Q179B, C7005A, C7005B |
| 100205B | Grounding Assembly for C7005A or C7005B | C7005A, C7005B |
| 101738A | Ignition Assembly for C7005A or C7005B includes electrode, Rajah connector and bracket | C7005A, C7005B |
| 101738B | Flame Rod Assembly for C7005A or C7005B | C7005A, C7005B |
| 101867B | LP Gas Venturi Mixing Tube for C7005A, B | C7005A, C7005B |
| 102464A | I Port Ground Assembly for Q179A, B | C7005B, Q179A, Q179B |
| 102464B | 45 degree I Port Ground Assembly for Q179A, B | Q179A, Q179B |
| 102464C | 45 degree Y Port Ground Assembly for Q179A, B | Q179A, Q179B |
| 102464F | T Port Ground Assembly for Q179A, B | Q179A, Q179B |
| 102464H | 45 degree T Port Ground Assembly for Q179A, B | Q179A, Q179B |
| 105066A | 45 degree RH ELL Tip Assembly, Q179A, B | Q179A, Q179B |
| 105067A | 45 degree LH ELL Tip Assembly, Q179A, B | Q179A, Q179B |
| 133444A | 45 degree LH ELL Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 133445A | Ignition Electrode & Insulator Assembly, Q179A, B | Q179A, Q179B |
| 133446A | 45 degree Y Port Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 133447A | Top ELL Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 133448A | I Port Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 133449A | RH 90 degree Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 133450A | 45 degree I Port Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 133451A | T Port or LH 90 degree Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 133452A | 45 degree RH ELL or T Port Flame Rod & Insulator, Q179A, B | Q179A, Q179B |
| 388146AF | Natural Gas spud orifice, .024 inch dia., Q179C, D | Q179C, Q179D |
| 388146KD | LP Gas spud orifice, .016 inch dia., Q179C, D | Q179C, Q179D |
| 395390-13 | LP Gas Orifice .013 inch dia. for Q179A, B | Q179A, Q179B |
| 395390-25 | Natural Gas Orifice .025 inch dia. for Q179A, B | Q179A, Q179B |
| 395390-28 | Natural Gas Orifice .028 inch dia. for Q179A, B | Q179A, Q179B |
| 7617CV | Insulator Assembly for C7005A, B, includes electrode insulator and mounting hardware | Q179B, C7005A, C7005B |
| 101740 | 8 inch Stainless steel Flame Electrode for C7005A and C7005B | C7005A, C7005B |
| 101741/0020 | 7/8 in. long Rajah Connector with plug end for C7005A or C7005B | C7005A, C7005B |
| 101742/0021 | Electrode Mounting Clip for C7005A or C7005B | C7005A, C7005B |
| 105063A | I Port Tip Assembly for Q179A or Q179B | C7005B, Q179A, Q179B |
| 105068A | T Port Tip Assembly for Q179A or Q179B | Q179A, Q179B |
| 105069A | 45 degree Y Port Tip Assembly for Q179A or Q179B | Q179A, Q179B |
| 105070A | 45 Degree T Port Tip Assembly for Q179A or Q179B | Q179A, Q179B |
| 121831A | Large I Port Tip Assembly for Q179A or Q179B | Q179A, Q179B |
| 37356-520 | Rajah connector for ignition electrode-Q179A,Q179B,Q179C,or Q179D. | Q179A, Q179B, Q179C, Q179D |
| R1061012 | Ignition cable or Flame Rod Cable. Rated at 350 F, 20,000 volts R.M.S. For use with C7005B, Q179A or Q179C | Q179D, C7005B, Q179A, Q179C |
| R1298020 | Cable Flame Rod Lead. Rated at 400 F, 600 volts R.M.S. For use with Q179 | Q179C |
| 388146KB | LP Gas spud orifice, .010 inch dia., Q179C, D | Q179C, Q179D |

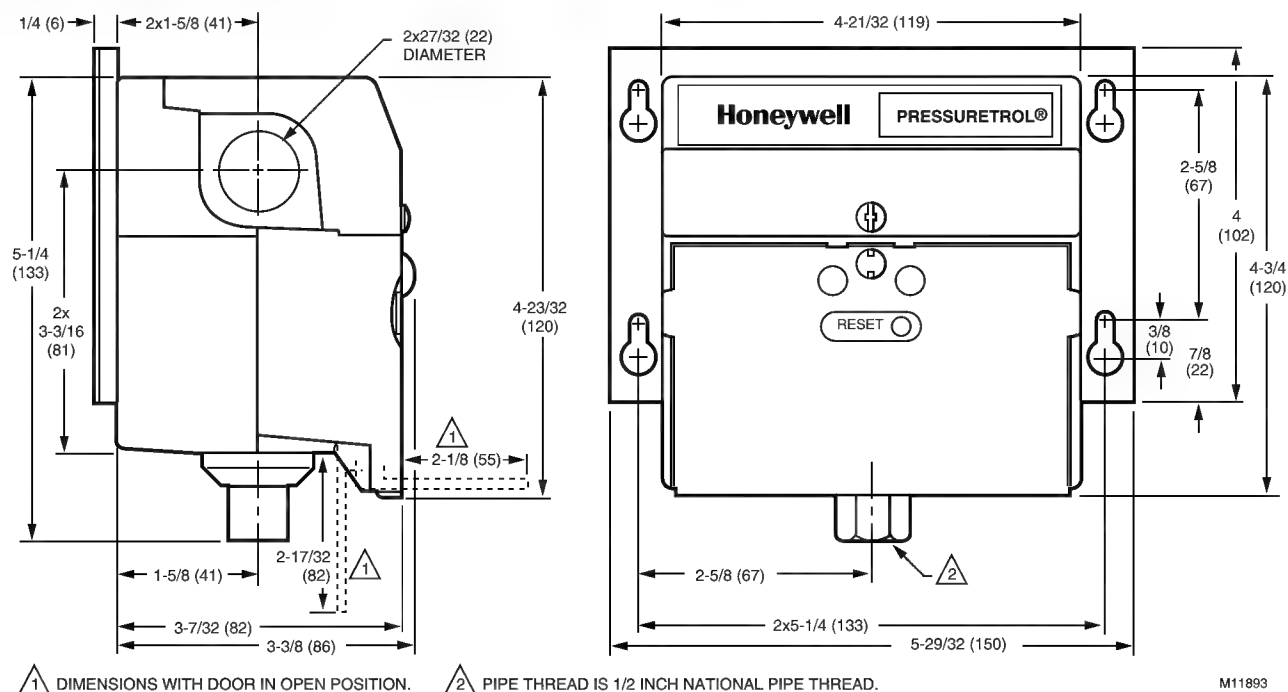
P7810 Pressure Control



Line voltage pressure controller that provides automatic operating control, automatic limit protection, manual reset limit protection, or modulating firing rate control for pressure systems up to 300 psi.

- May be used with steam, air, non-combustible gases or fluids that will not corrode the pressure sensing element.
- Models available in 15, 150, 300 psi maximum set points.
- LED indicators show limit function lockout.
- Reset function easily accessible under cover.
- Clear cover allows set point and differentials to be read (but not adjusted) without opening the cover.

Dimension Diagrams



M11893

Dimensions, Approximate: 5 1/4 in. high, 4 21/32 in. wide, 3 3/8 in. deep (133 mm high, 119 mm wide, 86 mm deep)

Case Material: Plastic

Electrical Connections: Screw terminals

Frequency (Hz): 50/60 Hz

Humidity Ratings (% RH): 5 to 95% RH, non-condensing

Piping Connections, Main or High Pressure: 1/4 in. NPT internal thread

Temperature Ratings: -40 F to 185 F (-40 C to 85 C)

Approvals:

Canadian Standards Association: Certified: File No. LR95329-6

Pressure Ratings:

Factory Mutual: Approved: Report No. J.I.2D3A6AF

Underwriters Laboratories, Inc: Listed: File No. MP268, Guide No. MCCZ

Switch Contact Ratings:

| |
|-------------------------------------|
| 120 Vac |
| 9.8 AFL, 58.8 ALR, 10.0 A resistive |

Accessories:

209731A Siphon Loop for P7810C, D

4074EWD P7810 Mounting Bracket and Mounting Screws (6)

| Range | Overpressure | | Maximum Sustained Pressure | | Burst Pressure | | Differential Pressure | |
|----------------------|--------------|----------|----------------------------|----------|----------------|-------|-----------------------|--------------------|
| | (psi) | (kPa) | (psi) | (kPa) | (psi) | (kPa) | (psi) | (kPa) |
| 0 to 15 psig | 22.5 psig | 155 kPa | 22.5 psi | 155 kPa | 60 psig | | 2 to 10 psig | 14 kPa to 41 kPa |
| 0 to 150 psig | 225 psig | 1551 kPa | 225 psi | 1551 kPa | 600 psig | | 5 to 20 psig | 35 kPa to 135 kPa |
| 0 to 300 psig | 450 psig | 3103 kPa | 450 psi | 3103 kPa | 1200 psig | | 15 to 50 psig | 103 kPa to 340 kPa |

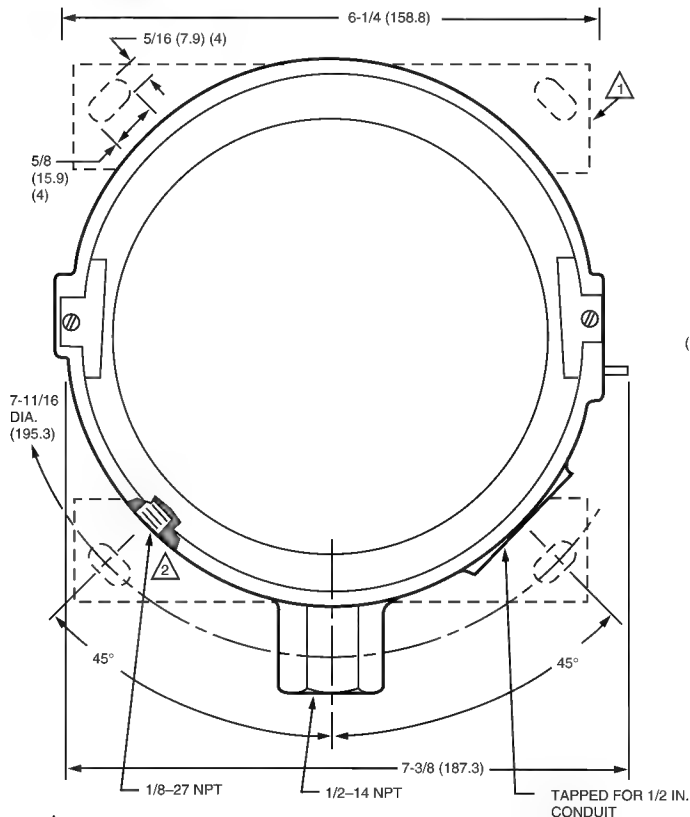
Pressure Controls

| Product Number | Modulating Output | Application | Operating Pressure Range | | Switching Action |
|----------------|-------------------|------------------------------------|--------------------------|-------------------|------------------------|
| | | | (psi) | (kPa) | |
| P7810A1004 | — | On - Off Control | 0 psi to 15 psi | 0 kPa to 103 kPa | Break on pressure rise |
| P7810A1012 | — | On - Off Control | 0 psi to 150 psi | 0 kPa to 1034 kPa | Break on pressure rise |
| P7810A1020 | — | On - Off Control | 0 psi to 300 psi | 0 kPa to 2068 kPa | Break on pressure rise |
| P7810B1002 | 4 mA to 20 mA | On-off plus Modulate | 0 psi to 15 psi | 0 kPa to 103 kPa | Break on pressure rise |
| P7810B1010 | 4 mA to 20 mA | On-off plus Modulate | 0 psi to 150 psi | 0 kPa to 1034 kPa | Break on pressure rise |
| P7810B1028 | 4 mA to 20 mA | On-off plus Modulate | 0 psi to 300 psi | 0 kPa to 2068 kPa | Break on pressure rise |
| P7810C1000 | 4 mA to 20 mA | On-off, Modulate and Limit Control | 0 psi to 15 psi | 0 kPa to 103 kPa | Break on pressure rise |
| P7810C1018 | 4 mA to 20 mA | On-off, Modulate and Limit Control | 0 psi to 150 psi | 0 kPa to 1034 kPa | Break on pressure rise |
| P7810C1026 | 4 mA to 20 mA | On-off, Modulate and Limit Control | 0 psi to 300 psi | 0 kPa to 2068 kPa | Break on pressure rise |
| P7810D1008 | — | On-off and Limit Control | 0 psi to 15 psi | 0 kPa to 103 kPa | Break on pressure rise |
| P7810D1016 | — | On-off and Limit Control | 0 psi to 150 psi | 0 kPa to 1034 kPa | Break on pressure rise |
| P7810D1024 | — | On-off and Limit Control | 0 psi to 300 psi | 0 kPa to 2068 kPa | Break on pressure rise |

C437; C637 Gas/Air Pressure Switches

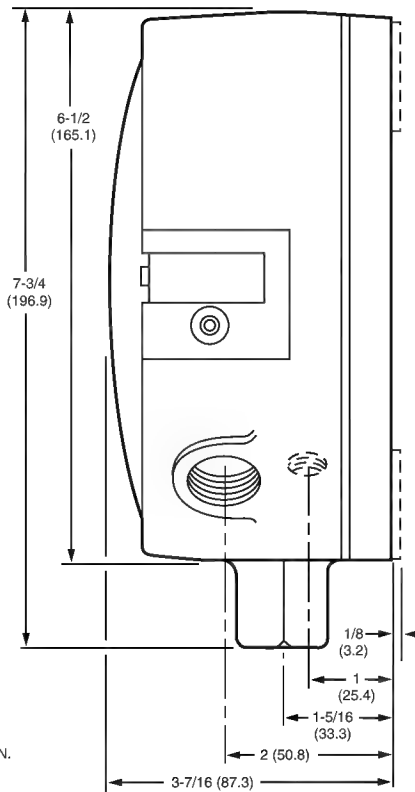


Dimension Diagram



1 137755 MOUNTING BRACKET (2), IN 4074BWK BAG ASSEMBLY – STANDARD ON C437G AND H; OPTIONAL ON OTHER MODELS.

2 VENT TAPPING. REMOVE DUST-SEAL LABEL BEFORE MOUNTING.



M7192

Application: Safety shutoff, pressure control, and differential-pressure control.

Case Material: Die-cast aluminum

Differential Type: Subtractive

Electrical Connections: Screw terminals

Piping Connections, Main or High Pressure: 1/2 in. NPT internal thread

Piping Connections, Vent or Low pressure: 1/8 in. NPT internal thread

Switch Contact Ratings:

| | 120 Vac | 120 Vdc | 240 Vac | 240 Vdc |
|------------------|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| C437D,E,H | 8.0 AFL, 48.0 ALR, 10.0 A resistive | 2.4 AFL, 24.0 ALR, 5.0 A resistive | 5.1 AFL, 30.6 ALR, 5.0 A resistive | 1.2 AFL, 12.0 ALR, 2.0 A resistive |
| C437F,J,K | 8.0 AFL, 48.0 ALR, 10.0 A resistive | 2.0 AFL, 20.0 ALR, 8.0 A resistive | 5.1 AFL, 30.6 ALR, 5.0 A resistive | 1.0 AFL, 10.0 ALR, 4.0 A resistive |
| C637B | 62.5 VA pilot duty | — | 62.5 VA pilot duty | — |

Temperature (max. ambient): 125 F (52 C)

Temperature Ratings: 32 F to 125 F (0 C to 52 C)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 380-W-1.16

Industrial Risk Insurers: Acceptable

Factory Mutual: Approved: Report No. 22018, 24127, J.I.IF4A3.AF

Underwriters Laboratories, Inc: Listed: File No. MP2168, Guide No. MFHX

Pressure Switches

| Product Number | Operating Pressure Range | | Pressure Differential | | Maximum Sustained Operating Pressure | | Switch Operation | Switching Action |
|------------------|----------------------------|---------------------|-----------------------|----------|--------------------------------------|-----------|------------------|---|
| | (psi) | (kPa) | (psi) | (kPa) | (psi) | (kPa) | | |
| C437D1005 | 1 in. wc to 26 in. wc | 0.5 kPa to 7.0 kPa | 1 3/4 in. wc | 0.44 kPa | 5.0 psi | 34.5 kPa | Manual Reset | SPST, break on rise |
| C437D1013 | 1/2 psi to 5 psi | 3.0 kPa to 35 kPa | 1/2 psi | 3.45 kPa | 15.0 psi | 103.4 kPa | Manual Reset | SPST, break on rise |
| C437D1021 | 1 psi to 10 psi | 5.0 kPa to 70.0 kPa | 1 psi | 6.89 kPa | 30.0 psi | 206.8 kPa | Manual Reset | SPST, break on rise |
| C437E1004 | 1 in. wc to 26 in. wc | 0.5 kPa to 7.0 kPa | 1 1/4 in. wc | 0.31 kPa | 5.0 psi | 34.5 kPa | Manual Reset | SPST, break on fall |
| C437E1012 | 1/2 psi to 5 psi | 3.0 kPa to 35 kPa | 1/4 psi | 1.72 kPa | 15.0 psi | 103.4 kPa | Manual Reset | SPST, break on fall |
| C437E1020 | 1 psi to 10 psi | 5.0 kPa to 70.0 kPa | 1/2 psi | 3.45 kPa | 30.0 psi | 206.8 kPa | Manual Reset | SPST, break on fall |
| C437E1038 | 1/2 in. wc to 5 1/2 in. wc | 0.1 kPa to 1.4 kPa | 0.25 in. wc | 0.06 kPa | 3.0 psi | 20.7 kPa | Manual Reset | SPST, break on fall |
| C437F1003 | 1 in. wc to 26 in. wc | 0.5 kPa to 7.0 kPa | 1 1/4 in. wc | 0.31 kPa | 5.0 psi | 34.5 kPa | Auto recycle | SPST (two), break one and make one |
| C437F1011 | 1/2 psi to 5 psi | 3.0 kPa to 35 kPa | 1/4 psi | 1.72 kPa | 15.0 psi | 103.4 kPa | Auto recycle | SPST (two), break one and make one |
| C437F1029 | 1 psi to 10 psi | 5.0 kPa to 70.0 kPa | 1/2 psi | 3.45 kPa | 30.0 psi | 206.8 kPa | Auto recycle | SPST (two), break one and make one |
| C437F1037 | 1/2 in. wc to 5 1/2 in. wc | 0.1 kPa to 1.4 kPa | 0.25 in. wc | 0.06 kPa | 3.0 psi | 20.7 kPa | Auto recycle | SPST (two), break one and make one |
| C437F1045 | 1 in. wc to 26 in. wc | 0.5 kPa to 7.0 kPa | 1 1/4 in. wc | 0.31 kPa | 5.0 psi | 34.5 kPa | Auto recycle | SPST (two), break one and make one |
| C437F1052 | 1/2 psi to 5 psi | 3.0 kPa to 35 kPa | 1/4 psi | 1.72 kPa | 15.0 psi | 103.4 kPa | Auto recycle | SPST (two), break one and make one |
| C437F1060 | 1 psi to 10 psi | 5.0 kPa to 70.0 kPa | 1/2 psi | 3.45 kPa | 30.0 psi | 206.8 kPa | Auto recycle | SPST (two), break one and make one |
| C437F1078 | 1/2 in. wc to 5 1/2 in. wc | 0.1 kPa to 1.4 kPa | 0.25 in. wc | 0.06 kPa | 3.0 psi | 20.7 kPa | Auto recycle | SPST (two), break one and make one |
| C437G1002 | 1 in. wc to 26 in. wc | 0.5 kPa to 7.0 kPa | 1 1/4 in. wc | 0.31 kPa | 5.0 psi | 34.5 kPa | Auto recycle | Break on pressure rise |
| C437H1027 | 1/2 psi to 5 psi | 3.0 kPa to 35 kPa | 1/4 psi | 1.72 kPa | 15.0 psi | 103.4 kPa | Auto recycle | SPST, breaks on fall, no manual reset, |
| C437H1076 | 1 in. wc to 26 in. wc | 0.5 kPa to 7.0 kPa | 1 1/4 in. wc | 0.31 kPa | 5.0 psi | 34.5 kPa | Auto recycle | SPST, break on fall, rain proof enclosure |
| C437H1084 | 1/2 psi to 5 psi | 3.0 kPa to 35 kPa | 1/4 psi | 1.72 kPa | 15.0 psi | 103.4 kPa | Auto recycle | SPST, break on fall, rain proof enclosure |
| C637B1002 | 1 in. wc to 26 in. wc | 0.5 kPa to 7.0 kPa | 1 1/4 in. wc | 0.31 kPa | 5.0 psi | 34.5 kPa | Auto recycle | SPST, breaks R-W and makes R-B on fall, no manual reset |
| C637B1028 | 1 psi to 10 psi | 5.0 kPa to 70.0 kPa | 1/2 psi | 3.45 kPa | 30.0 psi | 206.8 kPa | Auto recycle | SPDT break R-W, make R-B on pressure fall |
| C637B1036 | 1/2 in. wc to 5 1/2 in. wc | 0.1 kPa to 1.4 kPa | 1/2 psi | 3.45 kPa | 3.0 psi | 20.7 kPa | Auto recycle | SPST, breaks R-W and makes R-B on fall, no manual reset |

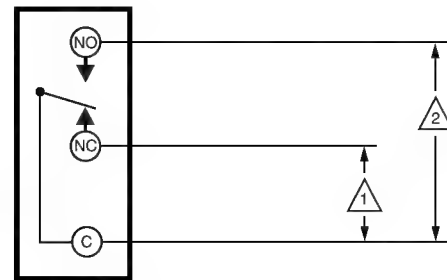
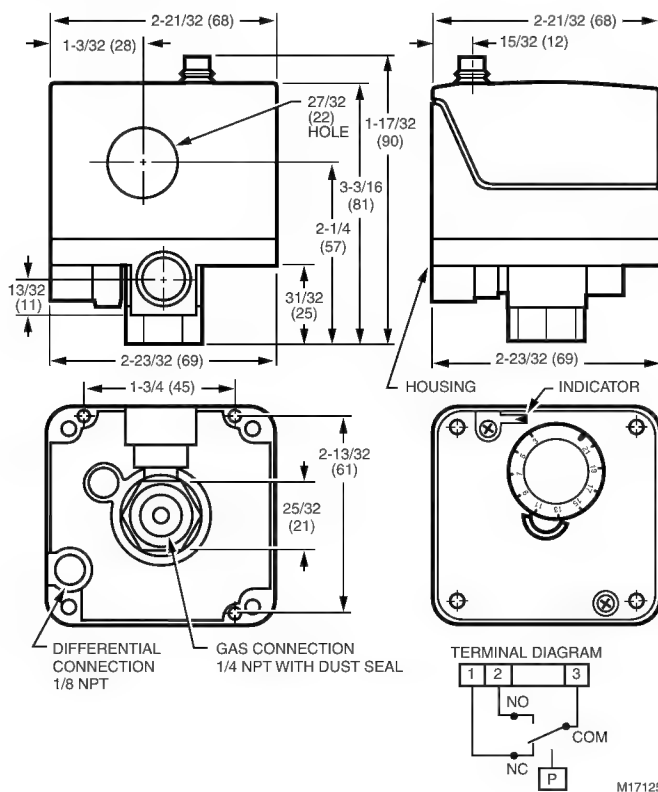
C6097 Pressure Switch



The C6097 Pressure Switches are safety devices used in positive-pressure or differential-pressure systems to sense gas or air pressure systems.

- For use with natural gas, liquid propane (LP) gas, or air.
- Diaphragm-actuated safety-limit switch.
- Switch can be wired to turn on alarm.
- C6097A models break control circuit at setpoint on pressure fall.
- C6097B models break control circuit at setpoint on pressure rise.
- Lockout with manual reset and recycle options.
- Lockout models have external manual reset button.
- Removable transparent cover protects scaleplate and adjusting knob.
- Pipe tappings allow selection of positive pressure (air only) or venting connections (NPT mount only).
- 1/4 in. NPT or flange mount models for direct mounting to Honeywell Integrated Valve Train.
- Optional switch position indicator lamp, part no. 32003039-001, available.
- IP54 enclosure standard.
- Ranges: 0.4 to 5 in.wc, 3 to 21 in.wc, 12 to 60 in.wc or 1.5 to 7 psi.
- Surge orifice.

Dimension Diagrams



1 C6097A BREAKS C-NO, MAKES C-NC ON PRESSURE FALL. MANUAL RESET MODELS LOCK OUT.

2 C6097B BREAKS C-NC, MAKES C-NO ON PRESSURE RISE AND LOCKS OUT.

M17123

Application: Safety devices used in positive-pressure or differential-pressure systems to sense gas or air pressure changes

Differential Type: Additive

Mounting: 1/4 in. NPT internal thread

Electrical Connections: Screw terminals

Piping Connections, Vent or Low pressure: 1/8 in. NPT internal thread

Temperature Ratings: -40 F to 140 F (-40 C to 60 C)

Approvals:

Canadian Standards Association: Certified

Industrial Risk Insurers: Acceptable

Factory Mutual: Approved

Other: CSD-1 AFB: Acceptable

Switch Contact Ratings:

| 120 Vac | 240 Vac |
|------------------------------------|------------------------------------|
| 3.0 AFL, 18.0 ALR, 5.0 A resistive | 3.0 AFL, 18.0 ALR, 5.0 A resistive |

Pressure Switches

| Product Number | Operating Pressure Range | | Pressure Differential | | Switch Operation | Pressure Differential | | | | Switching Action |
|----------------|--------------------------|----------------------|---|---|------------------|-----------------------|----------|-------------|-------------|-----------------------------------|
| | (psi) | (kPa) | (psi) | (kPa) | | Nominal | | Maximum | | |
| | (psi) | (kPa) | (psi) | (kPa) | | (psi) | (kPa) | (psi) | (kPa) | |
| C6097A1004 | 0.4 in. wc to 5 in. wc | 0.10 kPa to 1.25 kPa | — | — | Auto recycle | 0.16 in. wc | 0.04 kPa | 0.24 in. wc | 0.24 in. wc | Break N.O. to C. on pressure fall |
| C6097A1012 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | max. 2.4 in. wc @ min. setpoint; max. 4.2 in. wc @ max. setpoint: | max. 0.60 kPa @ min. setpoint; max. 1.05 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.O. to C. on pressure fall |
| C6097A1020 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | max. 2.4 in. wc @ min. setpoint; max. 4.2 in. wc @ max. setpoint: | max. 0.60 kPa @ min. setpoint; max. 1.05 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.O. to C. on pressure fall |
| C6097A1038 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | max. 10 in. wc @ min. setpoint; max. 12 in. wc @ max. setpoint: | max. 2.5 kPa @ min. setpoint; max. 3.0 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.O. to C. on pressure fall |
| C6097A1046 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | max. 10 in. wc @ min. setpoint; max. 12 in. wc @ max. setpoint: | max. 2.5 kPa @ min. setpoint; max. 3.0 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.O. to C. on pressure fall |
| C6097A1053 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | — | — | Auto recycle | 0.24 in. wc | 0.06 kPa | 0.48 in. wc | 0.48 in. wc | Break N.O. to C. on pressure fall |
| C6097A1061 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | — | — | Auto recycle | 0.24 in. wc | 0.06 kPa | 0.48 in. wc | 0.48 in. wc | Break N.O. to C. on pressure fall |
| C6097A1079 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | — | — | Auto recycle | 1.1 in. wc | 0.27 kPa | 2.4 in. wc | 2.4 in. wc | Break N.O. to C. on pressure fall |
| C6097A1087 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | — | — | Auto recycle | 1.1 in. wc | 0.27 kPa | 2.4 in. wc | 2.4 in. wc | Break N.O. to C. on pressure fall |
| C6097A1095 | 0.4 in. wc to 5 in. wc | 0.10 kPa to 1.25 kPa | max. 0.6 in. wc @ min. setpoint; max. 0.25 in. wc @ max. setpoint | max. 0.15 kPa @ min. setpoint; max. 0.25 kPa @ max. setpoint | Manual Reset | — | — | — | — | Break N.O. to C. on pressure fall |
| C6097A1103 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | max. 1.1 in. wc @ min. setpoint; max. 1.4 in. wc @ max. setpoint | max. 7.6 kPa @ min. setpoint; max. 9.6 kPa @ max. setpoint | Manual Reset | — | — | — | — | Break N.O. to C. on pressure fall |
| C6097A1111 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | max. 1.1 in. wc @ min. setpoint; max. 1.4 in. wc @ max. setpoint | max. 7.6 kPa @ min. setpoint; max. 9.6 kPa @ max. setpoint | Manual Reset | — | — | — | — | Break N.O. to C. on pressure fall |
| C6097A1129 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | — | — | Auto recycle | 0.1 psi | 0.69 kPa | 0.3 psi | 2.07 kPa | Break N.O. to C. on pressure fall |
| C6097A1137 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | — | — | Auto recycle | 0.1 psi | 0.69 kPa | 0.3 psi | 2.07 kPa | Break N.O. to C. on pressure fall |
| C6097A1210 | 0.4 in. wc to 5 in. wc | 0.10 kPa to 1.25 kPa | — | — | Auto recycle | 0.16 in. wc | 0.04 kPa | 0.24 in. wc | 0.24 in. wc | Break N.O. to C. on pressure fall |
| C6097A1228 | 0.4 in. wc to 5 in. wc | 0.10 kPa to 1.25 kPa | — | — | Manual Reset | 0.16 in. wc | 0.04 kPa | 0.24 in. wc | 0.24 in. wc | Break N.O. to C. on pressure fall |

Products are available through authorized Honeywell distributors

Pressure Switches

| Product Number | Operating Pressure Range | | Pressure Differential | | Switch Operation | Pressure Differential | | | | Switching Action |
|----------------|--------------------------|--------------------|--|--|------------------|-----------------------|----------|-------------|-------------|------------------------------------|
| | (psi) | (kPa) | (psi) | (kPa) | | Nominal | | Maximum | | |
| | | | | | | (psi) | (kPa) | (psi) | (kPa) | |
| C6097B1002 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | max. 10 in. wc @ min. setpoint; max. 12 in. wc @ max. setpoint: | max. 2.5 kPa @ min. setpoint; max. 3.0 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.C. to C. on pressure rise. |
| C6097B1010 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | max. 10 in. wc @ min. setpoint; max. 12 in. wc @ max. setpoint: | max. 2.5 kPa @ min. setpoint; max. 3.0 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.C. to C. on pressure rise. |
| C6097B1028 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | max. 2.4 in. wc @ min. setpoint; max. 4.2 in. wc @ max. setpoint: | max. 0.60 kPa @ min. setpoint; max. 1.05 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.C. to C. on pressure rise. |
| C6097B1036 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | max. 2.4 in. wc @ min. setpoint; max. 4.2 in. wc @ max. setpoint: | max. 0.60 kPa @ min. setpoint; max. 1.05 kPa @ max. setpoint: | Manual Reset | — | — | — | — | Break N.C. to C. on pressure rise. |
| C6097B1044 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | max. 1.1 in. wc @ min. setpoint; max. 1.4 in. wc @ max. setpoint | max. 7.6 kPa @ min. setpoint; max. 9.6 kPa @ max. setpoint | Manual Reset | — | — | — | — | Break N.C. to C. on pressure rise. |
| C6097B1051 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | max. 1.1 in. wc @ min. setpoint; max. 1.4 in. wc @ max. setpoint | max. 7.6 kPa @ min. setpoint; max. 9.6 kPa @ max. setpoint | Manual Reset | — | — | — | — | Break N.C. to C. on pressure rise. |
| C6097B1069 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | — | — | Auto recycle | 0.24 in. wc | 0.06 kPa | 0.48 in. wc | 0.48 in. wc | Break N.C. to C. on pressure rise. |
| C6097B1077 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | — | — | Auto recycle | 1.1 in. wc | 0.27 kPa | 2.4 in. wc | 2.4 in. wc | Break N.C. to C. on pressure rise. |
| C6097B1085 | 12 in. wc to 60 in. wc | 3.0 kPa to 15 kPa | — | — | Auto recycle | 1.1 in. wc | 0.27 kPa | 2.4 in. wc | 2.4 in. wc | Break N.C. to C. on pressure rise. |
| C6097B1093 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | — | — | Auto recycle | 0.1 psi | 0.69 kPa | 0.3 psi | 2.07 kPa | Break N.C. to C. on pressure rise. |
| C6097B1101 | 1.5 psi to 7 psi | 10.3 kPa to 48 kPa | — | — | Auto recycle | 0.1 psi | 0.69 kPa | 0.3 psi | 2.07 kPa | Break N.C. to C. on pressure rise. |
| C6097B1119 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | — | — | Auto recycle | 0.24 in. wc | 0.06 kPa | 0.48 in. wc | 0.48 in. wc | Break N.C. to C. on pressure rise. |

Pressure Switches

C645A,B Gas/Air Pressure Switches; C645C,D Air Pressure Switches; C645E Distillate Fuel Oil Pressure Switch



Application: Natural Gas, Liquid Propane (LP) or Air Switch

Mounting: 1/4 in. NPT internal thread

Piping Connections, Main or High Pressure: 1/4 in. NPT internal thread

Piping Connections, Vent or Low pressure: 1/8 in. NPT internal thread

Electrical Connections: Screw terminals

Temperature Ratings: -20 F to 125 F (-29 C to 52 C)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 140-A-2

Industrial Risk Insurers: Acceptable

Factory Mutual: Approved: Report No. 19268, 13233-S3

Underwriters Laboratories, Inc: Listed: File No. MP2168, Guide No. MFHX

Switch Contact Ratings:

| | 120 Vac | 240 Vac |
|--------------------|-------------------|-------------------|
| C645A,B,D,E | 7.4 AFL, 44.4 ALR | 3.7 AFL, 22.2 ALR |
| C645C | 8.0 AFL, 48.0 ALR | 5.1 AFL, 30.6 ALR |

Accessories:

137637B Cover with Window - C645A

137637C Cover with Window - C645B

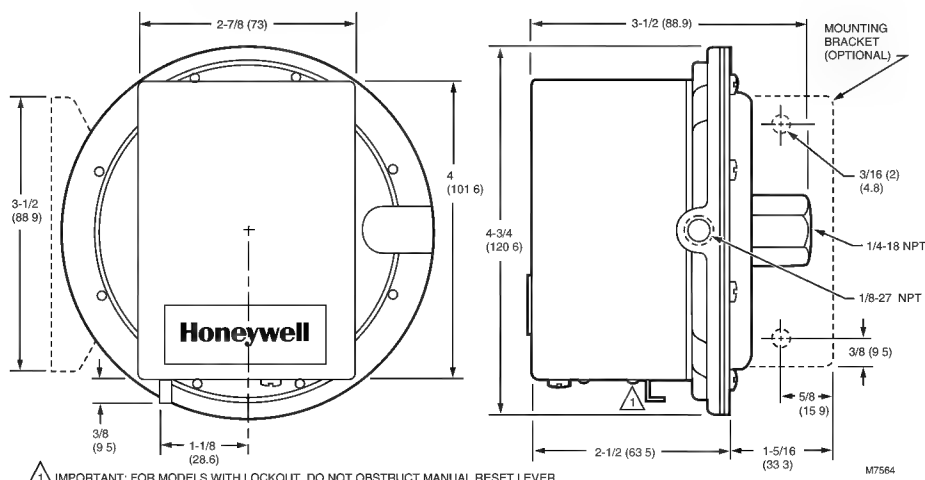
15865AC Mounting Bracket Assembly - C645A, B, D.

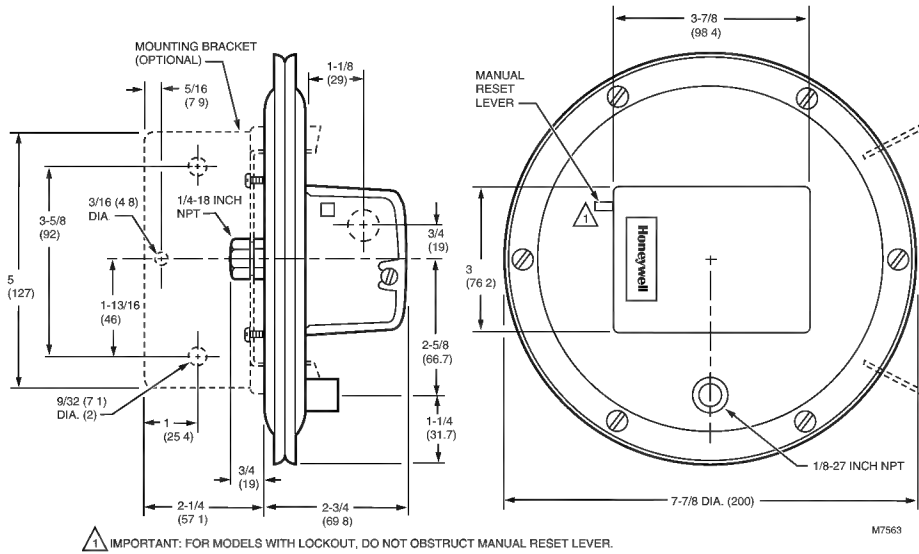
112657A C645 Mounting Bracket Assembly. (Includes screws)

Positive- or differential limit controls.

- Spdt diaphragm operated snap-acting Micro-Switch™ mechanism.
- C645E models for use with only distillate fuel; not with natural or LP gases.

Dimension Diagrams





| Product Number | Operating Pressure Range | | Maximum Sustained Operating Pressure | | Switch Operation | Pressure Differential | | | | Switching Action | Includes |
|----------------|--------------------------|---------------------|--------------------------------------|----------|------------------|-----------------------|----------|------------|------------|-----------------------------|--|
| | | | | | | Nominal | | Maximum | | | |
| | (psi) | (kPa) | (psi) | (kPa) | | (psi) | (kPa) | (psi) | (kPa) | | |
| C645A1006 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Auto recycle | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | — |
| C645A1022 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Auto recycle | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | Position indicator and cover window |
| C645A1030 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | Position indicator and cover window |
| C645A1055 | 5 in. wc to 35 in. wc | 1.2 kPa to 8.7 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 4.0 in. wc | 4.0 in. wc | SPDT break on pressure fall | Position indicator and cover window |
| C645A1063 | 5 in. wc to 35 in. wc | 1.2 kPa to 8.7 kPa | 5.0 psi | 34.5 kPa | Auto recycle | 1.0 in. wc | 0.2 kPa | 4.0 in. wc | 4.0 in. wc | SPDT break on pressure fall | Less cover |
| C645A1097 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Auto recycle | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | — |
| C645A1105 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | Position indicator and cover window |
| C645A2004 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | Position indicator, cover window, and meet ANSI miswiring requirements |
| C645B1013 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT make on pressure fall | Position indicator and cover window |
| C645B1039 | 5 in. wc to 35 in. wc | 1.2 kPa to 8.7 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 4.0 in. wc | 4.0 in. wc | SPDT make on pressure fall | Position indicator and cover window |
| C645B1047 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT make on pressure fall | Position indicator and cover window |
| C645B2003 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Manual Reset | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT make on pressure fall | Position indicator, cover window, and meet ANSI miswiring requirements |
| C645C1004 | 0.6 in. wc to 5.3 in. wc | 0.15 kPa to 1.3 kPa | 1.5 psi | 10.3 kPa | Auto recycle | 0.2 in. wc | 0.05 kPa | 0.8 in. wc | 0.8 in. wc | SPDT break on pressure fall | Cover Window |
| C645C1020 | 0.6 in. wc to 5.3 in. wc | 0.15 kPa to 1.3 kPa | 1.5 psi | 10.3 kPa | Auto recycle | 0.2 in. wc | 0.05 kPa | 0.8 in. wc | 0.8 in. wc | SPDT break on pressure fall | Position indicator and cover window |

Pressure Switches

| Product Number | Operating Pressure Range | | Maximum Sustained Operating Pressure | | Switch Operation | Pressure Differential | | | | Switching Action | Includes |
|----------------|---------------------------|---------------------|--------------------------------------|----------|------------------|-----------------------|----------|------------|------------|---|-------------------------------------|
| | | | | | | Nominal | | Maximum | | | |
| | (psi) | (kPa) | (psi) | (kPa) | | (psi) | (kPa) | (psi) | (kPa) | | |
| C645C1038 | 0.6 in. wc to 5.3 in. wc | 0.15 kPa to 1.3 kPa | 1.5 psi | 10.3 kPa | Manual Reset | 0.2 in. wc | 0.05 kPa | 0.8 in. wc | 0.8 in. wc | SPDT break on pressure fall | Position indicator and cover window |
| C645D1029 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Auto recycle | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | — |
| C645D1052 | 2.0 in. wc to 20.0 in. wc | 0.5 kPa to 5.0 kPa | 5.0 psi | 34.5 kPa | Auto recycle | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break on pressure fall | — |
| C645E1002 | 3 in. wc to 21 in. wc | 0.7 kPa to 5.2 kPa | 5.0 psi | 34.5 kPa | Auto recycle | 1.0 in. wc | 0.2 kPa | 3.0 in. wc | 3.0 in. wc | SPDT break R-W, make R-B on pressure fall | — |

L404A,B,C,D,F,N; L604 Pressuretrol® Controllers

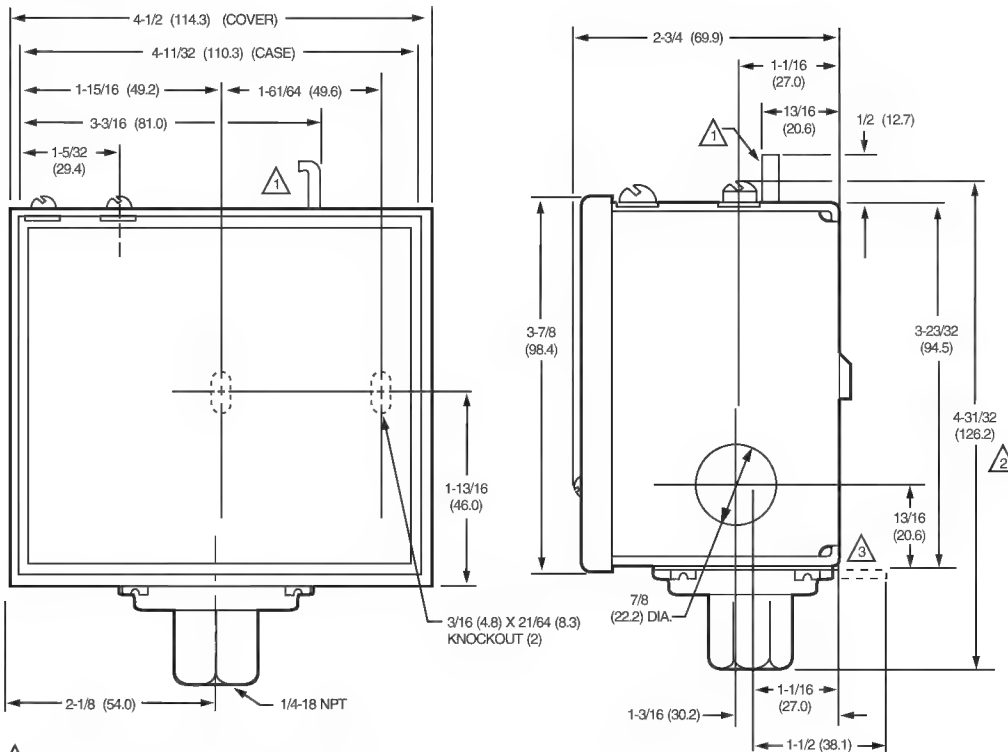


Provide operating control, automatic or manual reset limit protection for pressure systems up to 300 psi (2068 kPa)

- Use with steam, air, noncombustible gases, or other fluids noncorrosive to pressure sensing element.
- Provide dustproof, trouble-free mercury switching; L404F has snap-acting switching.
- Trip-free mechanism on manual reset models so the limit function of the controller cannot be defeated by jamming the reset lever.
- Adjustments are made by screws on top of case.
- Mount using 1/4 in. NPT female threads or surface mount through base of case.

Dimension Diagrams

L404A-D,F; L604A,L



1 RESET LEVER (ON MANUAL RESET MODELS ONLY.)

2 THIS DIMENSION IS 4-27/32 IN. (123.0 MM) ON L604 MODELS WITH A 2 TO 15 PSI (.14 TO 1.0 kg/cm² (14 TO 103 kPa)) OPERATING RANGE, AND 5-3/4 IN. (146.0 MM) ON L604 MODELS WITH A 20 TO 300 PSI (1.4 TO 20.7 kg/cm² (138 TO 2068 kPa)) OPERATING RANGE.

3 ONLY ON L604 MODELS WITH A 2 TO 15 PSI (.14 TO 1.0 kg/cm² (14 TO 103 kPa)) OPERATING RANGE.

M8933

Application: Provide control of steam, air, non-combustible gases or non-corrosive fluids

Differential Type: Subtractive

Mounting: 1/4 in. NPT internal thread or surface mount through back of case

Electrical Connections: Screw terminals

Piping Connections, Main or High Pressure: 1/4 in. NPT internal thread

Temperature Ratings: -35 F to 150 F (-37 C to 66 C)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 400-E-O

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP466, Guide No. MBPR

Switch Contact Ratings:

| | 120 Vac | 120 Vdc | 240 Vac | 240 Vdc |
|------------------|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| L404A,B,C | 8.0 AFL, 48.0 ALR, 10.0 A resistive | 2.4 AFL, 24.0 ALR, 5.0 A resistive | 5.1 AFL, 30.6 ALR, 5.0 A resistive | 1.2 AFL, 12.0 ALR, 2.0 A resistive |
| L404F | 8.0 AFL, 48.0 ALR, 10.0 A resistive | — | 5.1 AFL, 30.6 ALR, 5.0 A resistive | — |
| L604A,L | 8.0 AFL, 48.0 ALR, 10.0 A resistive | 2.0 AFL, 20.0 ALR, 8.0 A resistive | 5.1 AFL, 30.6 ALR, 5.0 A resistive | 1.0 AFL, 10.0 ALR, 4.0 A resistive |
| L604N | 8.0 AFL, 48.0 ALR | — | 5.1 AFL, 30.6 ALR | — |

Pressuretrol Controllers

Accessories:

33312B Pressure Control/Limits, Knurled Adjustment knob-with set screw. Fits head of main adjusting screw to permit adjusting without screwdriver.

4074BWJ Pressure Control/Limits, Limit Stop Assembly - to limit set point. Includes 129564 Range Stop, 107194 Range Stop Screw and 23466 Wrench.

| Product Number | Operating Pressure Range | | Pressure Differential | | Maximum Sustained Operating Pressure | | Switch Operation | Switching Action | Includes |
|------------------|--------------------------|---------------------|-----------------------|--------------------|--------------------------------------|----------|------------------|--|--|
| | (psi) | (kPa) | (psi) | (kPa) | (psi) | (kPa) | | | |
| L404A1354 | 2 psi to 15 psi | 14 kPa to 103 kPa | 2 psi to 6 psi | 14 kPa to 41 kPa | 50 psi | 345 kPa | Auto recycle | SPST break on pressure rise | — |
| L404A1370 | 5 psi to 50 psi | 35 kPa to 345 kPa | 4 psi to 12 psi | 28 kPa to 83 kPa | 85 psi | 586 kPa | Auto recycle | SPST break on pressure rise | — |
| L404A1396 | 10 psi to 150 psi | 69 kPa to 1034 kPa | 8 psi to 16 psi | 55 kPa to 110 kPa | 225 psi | 1551 kPa | Auto recycle | SPST break on pressure rise | — |
| L404A1404 | 20 psi to 300 psi | 138 kPa to 2068 kPa | 15 psi to 40 psi | 103 kPa to 276 kPa | 350 psi | 2413 kPa | Auto recycle | SPST break on pressure rise | Siphon Loop |
| L404A1636 | 2 psi to 15 psi | 14 kPa to 103 kPa | 2 psi to 6 psi | 14 kPa to 41 kPa | 25 psi | 345 kPa | Auto recycle | SPST break on pressure rise | — |
| L404B1296 | 2 psi to 15 psi | 14 kPa to 103 kPa | 2 psi to 6 psi | 14 kPa to 41 kPa | 50 psi | 345 kPa | Auto recycle | SPST make on pressure rise | Siphon Loop |
| L404B1304 | 2 psi to 15 psi | 14 kPa to 103 kPa | 2 psi to 6 psi | 14 kPa to 41 kPa | 50 psi | 345 kPa | Auto recycle | SPST make on pressure rise | — |
| L404B1320 | 5 psi to 50 psi | 35 kPa to 345 kPa | 4 psi to 12 psi | 28 kPa to 83 kPa | 85 psi | 586 kPa | Auto recycle | SPST make on pressure rise | — |
| L404B1346 | 10 psi to 150 psi | 69 kPa to 1034 kPa | 8 psi to 16 psi | 55 kPa to 110 kPa | 225 psi | 1551 kPa | Auto recycle | SPST make on pressure rise | — |
| L404B1353 | 20 psi to 300 psi | 138 kPa to 2068 kPa | 15 psi to 40 psi | 103 kPa to 276 kPa | 350 psi | 2413 kPa | Auto recycle | SPST make on pressure rise | — |
| L404B1361 | 2 psi to 15 psi | 14 kPa to 103 kPa | 1 psi to 6 psi | 7 kPa to 41 kPa | 25 psi | 172 kPa | Auto recycle | SPST make on pressure rise | — |
| L404B1577 | 2 psi to 15 psi | 14 kPa to 103 kPa | 1 psi to 6 psi | 7 kPa to 41 kPa | 25 psi | 172 kPa | Auto recycle | SPST make on pressure rise | — |
| L404C1113 | 5 psi to 50 psi | 35 kPa to 345 kPa | — | — | 85 psi | 586 kPa | Manual Reset | SPST break on pressure rise | Siphon Loop |
| L404C1139 | 20 psi to 300 psi | 138 kPa to 2068 kPa | — | — | 350 psi | 2413 kPa | Manual Reset | SPST break on pressure rise | Siphon Loop |
| L404C1147 | 2 psi to 15 psi | 14 kPa to 103 kPa | — | — | 50 psi | 345 kPa | Manual Reset | SPST break on pressure rise | — |
| L404C1154 | 5 psi to 50 psi | 35 kPa to 345 kPa | — | — | 85 psi | 586 kPa | Manual Reset | SPST break on pressure rise | — |
| L404C1162 | 10 psi to 150 psi | 69 kPa to 1034 kPa | — | — | 225 psi | 1551 kPa | Manual Reset | SPST break on pressure rise | — |
| L404F1060 | 2 psi to 15 psi | 14 kPa to 103 kPa | 2 psi to 6 psi | 14 kPa to 41 kPa | 25 psi | 345 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | Siphon Loop |
| L404F1078 | 5 psi to 50 psi | 35 kPa to 345 kPa | 6 psi to 14 psi | 41 kPa to 97 kPa | 85 psi | 586 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | Siphon Loop |
| L404F1094 | 20 psi to 300 psi | 138 kPa to 2068 kPa | 20 psi to 50 psi | 138 kPa to 345 kPa | 350 psi | 2413 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | Siphon Loop |
| L404F1102 | 10 psi to 150 psi | 69 kPa to 1034 kPa | 10 psi to 22 psi | 60 kPa to 152 kPa | 225 psi | 1551 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | — |
| L404F1227 | 10 psi to 150 psi | 69 kPa to 1034 kPa | 10 psi to 22 psi | 60 kPa to 152 kPa | 225 psi | 1551 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | BSPT ground screw and European Enclosure |
| L404F1235 | 20 psi to 300 psi | 138 kPa to 2068 kPa | 20 psi to 50 psi | 138 kPa to 345 kPa | 350 psi | 2413 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | BSPT ground screw and European Enclosure |
| L404F1243 | 5 psi to 50 psi | 35 kPa to 345 kPa | 6 psi to 14 psi | 41 kPa to 97 kPa | 85 psi | 586 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | BSPT ground screw and European Enclosure |

Products are available through authorized Honeywell distributors

Pressuretrol Controllers

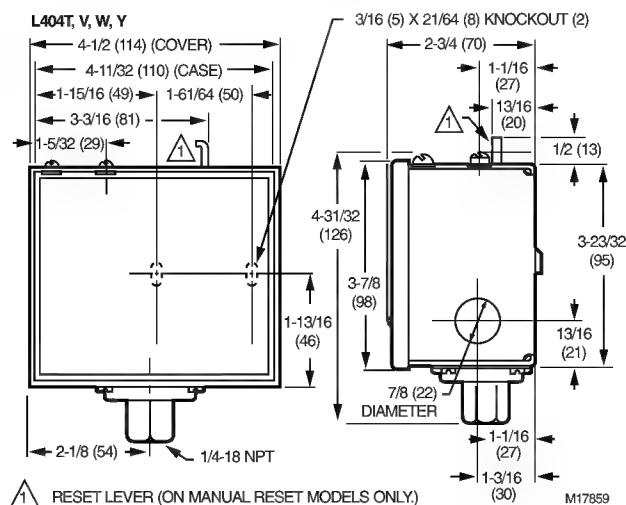
| Product Number | Operating Pressure Range | | Pressure Differential | | Maximum Sustained Operating Pressure | | Switch Operation | Switching Action | Includes |
|------------------|--------------------------|----------------------|-----------------------|--------------------|--------------------------------------|----------|------------------|---|--|
| | (psi) | (kPa) | (psi) | (kPa) | (psi) | (kPa) | | | |
| L404F1300 | 60 psi to 180 psi | — | 6 psi | 41 kPa | 225 | 1151 kPa | Auto recycle | SPDT snap action, make R-W, break R-B on pressure rise | BSPT ground screw and European Enclosure |
| L604A1169 | 2 psi to 15 psi | 14 kPa to 103 kPa | 2 psi to 6 psi | 14 kPa to 41 kPa | 25 psi | 172 kPa | Auto recycle | Isolated SPST (two) make R1-W Break R2-B on pressure rise | Siphon Loop |
| L604A1177 | 5 psi to 50 psi | 35 kPa to 345 kPa | 4 psi to 12 psi | 28 kPa to 83 kPa | 85 psi | 586 kPa | Auto recycle | Isolated SPST (two) make R1-W Break R2-B on pressure rise | Siphon Loop |
| L604A1185 | 10 psi to 150 psi | 69 kPa to 1034 kPa | 8 psi to 16 psi | 55 kPa to 110 kPa | 225 psi | 1551 kPa | Auto recycle | Isolated SPST (two) make R1-W Break R2-B on pressure rise | Siphon Loop |
| L604A1193 | 20 psi to 300 psi | 138 kPa to 2068 kPa | 15 psi to 40 psi | 103 kPa to 276 kPa | 350 psi | 2413 kPa | Auto recycle | Isolated SPST (two) make R1-W Break R2-B on pressure rise | Siphon Loop |
| L604L1035 | 2 psi to 15 psi | 14 kPa to 103 kPa | — | — | 25 psi | 172 kPa | Manual Reset | SPDT make R-W, break R-B on pressure rise | Siphon Loop |
| L604N1009 | 10 psi to 150 psi | 69 kPa to 1034 kPa | 7 psi | 48.2 kPa | 225 psi | 1551 kPa | Auto recycle | SPDT (two) break R-B simultaneously | Siphon Loop |
| L404A1651 | 0.5 psi to 5.0 psi | .05 KGcm to .35 KGcm | — | — | 5.0 psi | 34.5 kPa | Auto recycle | SPST break on pressure rise | — |

Pressuretrol Controllers

L404T,V,W Pressuretrol® Limit Controllers



Dimension Diagrams



Application: High oil pressure limit switch
Differential Type: Subtractive

Oil pressure sensing devices for use on oil burner systems using any type of fuel oil, including heavy pretreated oils.

- Provide dustproof, trouble-free mercury switching.
- Clear plastic cover allows observation of the pressure settings and switch action.
- Siphon loop provides thermal buffer to diaphragm.
- Trip-free mechanism on manual reset models so the limit function of the controller cannot be defeated by jamming the reset lever.
- Adjustments are made by screws on top of case (under a protective cover).
- Mount using 1/4 in. NPT female threads or surface mount through base of case.

Mounting: 1/4 in. NPT internal thread or surface mount through back of case

Electrical Connections: Screw terminals

Piping Connections, Main or High Pressure: 1/4 in. NPT internal thread

Includes: Siphon Loop

Temperature Ratings: -35 F to 150 F (-37 C to 66 C)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 400-E-O

Industrial Risk Insurers: Acceptable

Factory Mutual: Approved: Report No. 26036

Underwriters Laboratories, Inc: Listed: File No. MP2168, Guide No. MFHX

Switch Contact Ratings:

| 120 Vac | 120 Vdc | 240 Vac | 240 Vdc |
|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 8.0 AFL, 48.0 ALR, 10.0 A resistive | 2.4 AFL, 24.0 ALR, 5.0 A resistive | 5.1 AFL, 30.6 ALR, 5.0 A resistive | 1.2 AFL, 12.0 ALR, 2.0 A resistive |

Accessories:

33312B Pressure Control/Limits, Knurled Adjustment knob-with set screw. Fits head of main adjusting screw to permit adjusting without screwdriver.

4074BWJ Pressure Control/Limits, Limit Stop Assembly - to limit set point. Includes 129564 Range Stop, 107194 Range Stop Screw and 23466 Wrench.

| Product Number | Operating Pressure Range | | Pressure Differential | | Maximum Sustained Operating Pressure | | Switch Operation | Switching Action |
|----------------|--------------------------|---------------------|-----------------------|-------------------|--------------------------------------|----------|------------------|-----------------------------|
| | (psi) | (kPa) | (psi) | (kPa) | (psi) | (kPa) | | |
| L404T1022 | 10 psi to 50 psi | 69 kPa to 345 kPa | 4 psi to 8 psi | 28 kPa to 55 kPa | 85 psi | 586 kPa | Auto recycle | SPST break on pressure rise |
| L404T1030 | 25 psi to 150 psi | 172 kPa to 1034 kPa | 8 psi to 16 psi | 50 kPa to 110 kPa | 225 psi | 1551 kPa | Auto recycle | SPST break on pressure rise |
| L404V1046 | 25 psi to 150 psi | 172 kPa to 1034 kPa | 8 psi to 16 psi | 50 kPa to 110 kPa | 225 psi | 1551 kPa | Auto recycle | SPST make on pressure fall |
| L404V1053 | 10 psi to 50 psi | 69 kPa to 345 kPa | 4 psi to 8 psi | 28 kPa to 55 kPa | 85 psi | 586 kPa | Auto recycle | SPST make on pressure fall |
| L404W1037 | 25 psi to 150 psi | 172 kPa to 1034 kPa | 8 psi | 55 kPa | 225 psi | 1551 kPa | Manual Reset | SPST break on pressure rise |

L4079 Pressuretrol® Limit Controllers



High pressure limit switches.

- Stainless steel diaphragm for use with steam, air, noncombustible gases and fluids noncorrosive to stainless steel.
- Micro Switch™ snap-acting switches open automatically on pressure rise; must be manually reset.
- Includes 14026 Siphon Loop.
- Mount using 1/4 in. NPT female fitting on diaphragm assembly or surface mount through back of case.

Dimensions, Approximate: 5 in. high; 4 1/2 in. wide, 3 1/2 in. deep. (127 mm high; 114 mm wide, 89 mm deep.)

Application: Provide limit control of steam, air, non-combustible gases or non-corrosive fluids

Mounting: 1/4 in. NPT internal thread or surface mount through back of case

Electrical Connections: Screw terminals

Piping Connections, Main or High Pressure: 1/4 in. NPT internal thread

Temperature (max. ambient): 150 F (66 C)

Approvals:

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP466, Guide No. MBPR

Switch Contact Ratings:

| 120 Vac | 240 Vac |
|-------------------|-------------------|
| 9.8 AFL, 58.8 ALR | 4.9 AFL, 29.4 ALR |

Accessories:

33312B Pressure Control/Limits, Knurled Adjustment knob-with set screw. Fits head of main adjusting screw to permit adjusting without screwdriver.

4074BWJ Pressure Control/Limits, Limit Stop Assembly - to limit set point. Includes 129564 Range Stop, 107194 Range Stop Screw and 23466 Wrench.

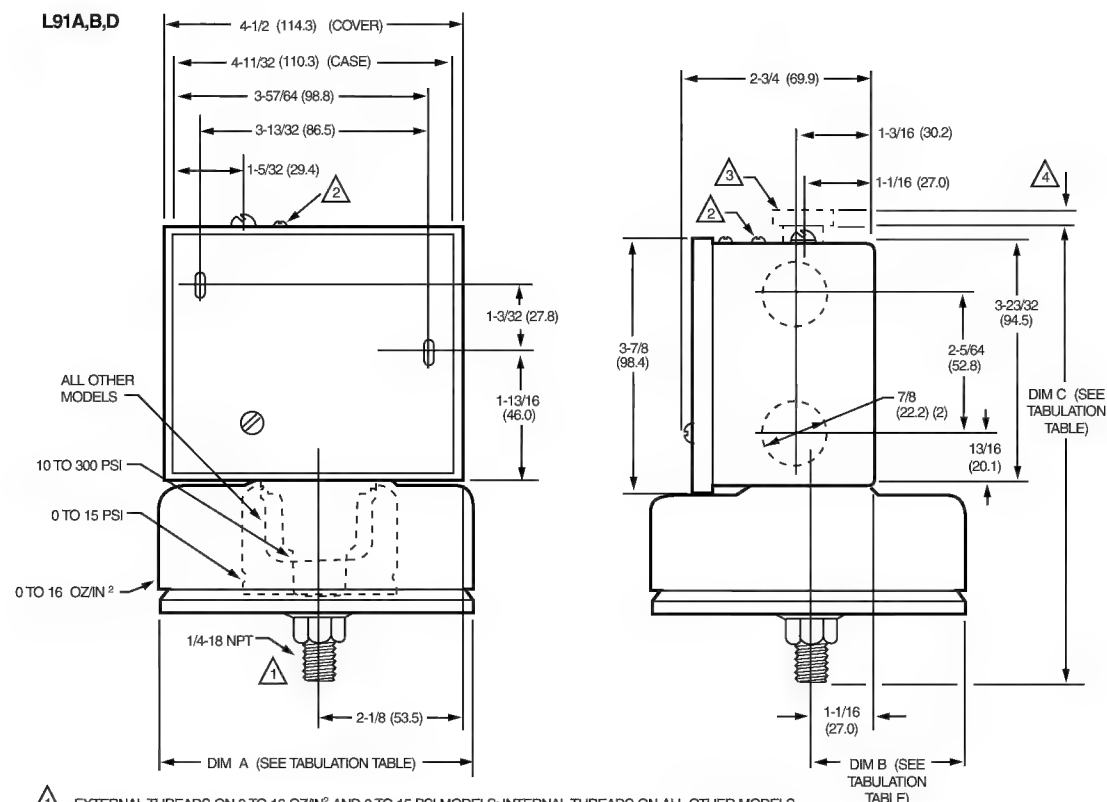
| Product Number | Operating Pressure Range | | Maximum Sustained Operating Pressure | | Switch Operation | Switching Action | Includes |
|-------------------|--------------------------|--------------------|--------------------------------------|----------|------------------|--|-------------|
| | (psi) | (kPa) | (psi) | (kPa) | | | |
| L4079A1035 | 2 psi to 15 psi | 14 kPa to 103 kPa | 25 psi | 172 kPa | Manual Reset | SPST (two) break simultaneously on pressure rise | Siphon Loop |
| L4079A1050 | 10 psi to 150 psi | 69 kPa to 1034 kPa | 225 psi | 1551 kPa | Manual Reset | SPST (two) break simultaneously on pressure rise | Siphon Loop |
| L4079B1033 | 2 psi to 15 psi | 14 kPa to 103 kPa | 25 psi | 172 kPa | Manual Reset | SPST break on pressure rise | Siphon Loop |

Pressuretrol Controllers

L91 Proportional Pressuretrol® Controllers



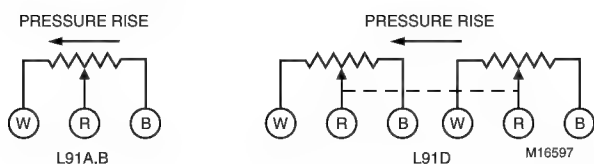
Dimension Diagrams



- 1 EXTERNAL THREADS ON 0 TO 16 OZ/IN² AND 0 TO 15 PSI MODELS; INTERNAL THREADS ON ALL OTHER MODELS. SOME MODELS ARE ALSO AVAILABLE WITH 1/4-19 BSP-TR INTERNAL THREADS; SEE TABLE 1.
- 2 PROPORTIONING RANGE ADJUSTING SCREW ON L91B,D MODELS ONLY.
- 3 33312B KNURLED ADJUSTMENT SCREW KNOB, 7/8 IN. [22.2 MM] DIAMETER. KNOB IS INCLUDED WITH 10 TO 300 PSI [0.07 TO .07 MPa] MODELS; OPTIONAL ACCESSORY FOR OTHER MODELS.
- 4 FOR 10 TO 300 PSI [0.07 TO 2.07 MPa] MODELS. DIM C INCLUDES THE KNURLED ADJUSTMENT KNOB.

| OPERATING RANGE | | DIM A | | DIM B | | DIM C | |
|----------------------------|------------------|----------|-------|----------|------|------------|---------|
| CUSTOMARY UNITS | METRIC UNITS | IN. | MM | IN. | MM | IN. | MM |
| 0 TO 16 OZ/IN ² | 0 TO 7 kPa | 4 - 7/8 | 123.8 | 2 - 7/16 | 61.9 | 7 - 1/32 | 178.6 |
| 0 TO 15 PSI | 0 TO 103 kPa | 2 - 7/16 | 61.9 | 1 - 7/32 | 31.0 | 6 - 7/8 | 174.6 |
| 2 TO 50 PSI | 14 TO 345 kPa | 1 - 5/8 | 41.3 | 13/16 | 20.6 | 5 - 3/4 | 146.1 |
| 5 TO 150 PSI | 0.03 TO 1.03 MPa | 1 - 5/8 | 41.3 | 13/16 | 20.6 | 5 - 3/4 | 146.1 |
| 10 TO 300 PSI | 0.07 TO 2.07 MPa | 1 - 1/4 | 31.8 | 5/8 | 15.9 | 6 - 1/16 4 | 154.0 4 |

M8524A



Products are available through authorized Honeywell distributors

Pressuretrol Controllers

Application: Modulating pressure control for regulation of liquid, air, or other non-corrosive gases.

Mounting: optional surface mount through back of case

Electrical Connections: Screw terminals

Piping Connections, Main or High Pressure: 1/4 in. NPT external thread

Temperature Ratings: 32 F to 150 F (0 C to 66 C)

| Product Number | Modulating Output | Operating Pressure Range | | Pressure Differential | | Maximum Sustained Operating Pressure | | Switch Operation | Includes |
|----------------|--------------------------------|---|--------------------|---|---------------------|--------------------------------------|----------|------------------|-------------|
| | | (psi) | (kPa) | (psi) | (kPa) | (psi) | (kPa) | | |
| L91A1037 | Single potentiometer, 140 ohms | 0 psi to 15 psi | 0 kPa to 103 kPa | 0.5 psi | 3.4 kPa | 25 psi | 172 kPa | Modulating | — |
| L91A1052 | Single potentiometer, 140 ohms | 5 psi to 150 psi | 34 kPa to 1034 kPa | 5 psi | 34 kPa | 225 psi | 1551 kPa | Modulating | — |
| L91A1078 | Single potentiometer, 140 ohms | 10 psi to 300 psi | 69 kPa to 2068 kPa | 12 psi | 83 kPa | 325 psi | 2241 kPa | Modulating | Siphon Loop |
| L91A1136 | Single potentiometer, 140 ohms | 10 psi to 300 psi | 69 kPa to 2068 kPa | 12 psi | 83 kPa | 325 psi | 2241 kPa | Modulating | Siphon Loop |
| L91B1019 | Single potentiometer, 140 ohms | 0 oz/in ² to 16 oz/in ² | 0 kPa to 6.9 kPa | 2 oz/in ² to 38 oz/in ² | 0.9 kPa to 16.4 kPa | 6 psi | 41 kPa | Modulating | — |
| L91B1035 | Single potentiometer, 140 ohms | 0 psi to 15 psi | 0 kPa to 103 kPa | 1 1/2 psi to 12 psi | 10 kPa to 83 kPa | 25 psi | 172 kPa | Modulating | — |
| L91B1043 | Single potentiometer, 140 ohms | 2 psi to 50 psi | 14 kPa to 345 kPa | 5 psi to 32 psi | 34 kPa to 221 kPa | 85 psi | 586 kPa | Modulating | — |
| L91B1050 | Single potentiometer, 140 ohms | 5 psi to 150 psi | 34 kPa to 1034 kPa | 5 psi to 23 psi | 35 kPa to 160 kPa | 225 psi | 1551 kPa | Modulating | — |
| L91B1068 | Single potentiometer, 140 ohms | 10 psi to 300 psi | 69 kPa to 2068 kPa | 28 psi to 110 psi | 193 kPa to 758 kPa | 325 psi | 2241 kPa | Modulating | Siphon Loop |
| L91B1241 | Single potentiometer, 140 ohms | 10 psi to 300 psi | 69 kPa to 2068 kPa | 12 psi to 48 psi | 85 kPa to 330 kPa | 325 psi | 2241 kPa | Modulating | Siphon Loop |
| L91D1015 | Dual potentiometer, 140 ohms | 0 psi to 15 psi | 0 kPa to 103 kPa | 1 1/2 psi to 12 psi | 10 kPa to 83 kPa | 25 psi | 172 kPa | Modulating | — |
| L91D1031 | Dual potentiometer, 140 ohms | 5 psi to 150 psi | 34 kPa to 1034 kPa | 11 psi to 52 psi | 76 kPa to 359 kPa | 225 psi | 1551 kPa | Modulating | — |
| L91D1049 | Dual potentiometer, 140 ohms | 10 psi to 300 psi | 69 kPa to 2068 kPa | 28 psi to 110 psi | 193 kPa to 758 kPa | 325 psi | 2241 kPa | Modulating | Siphon Loop |

Vaporized Controllers

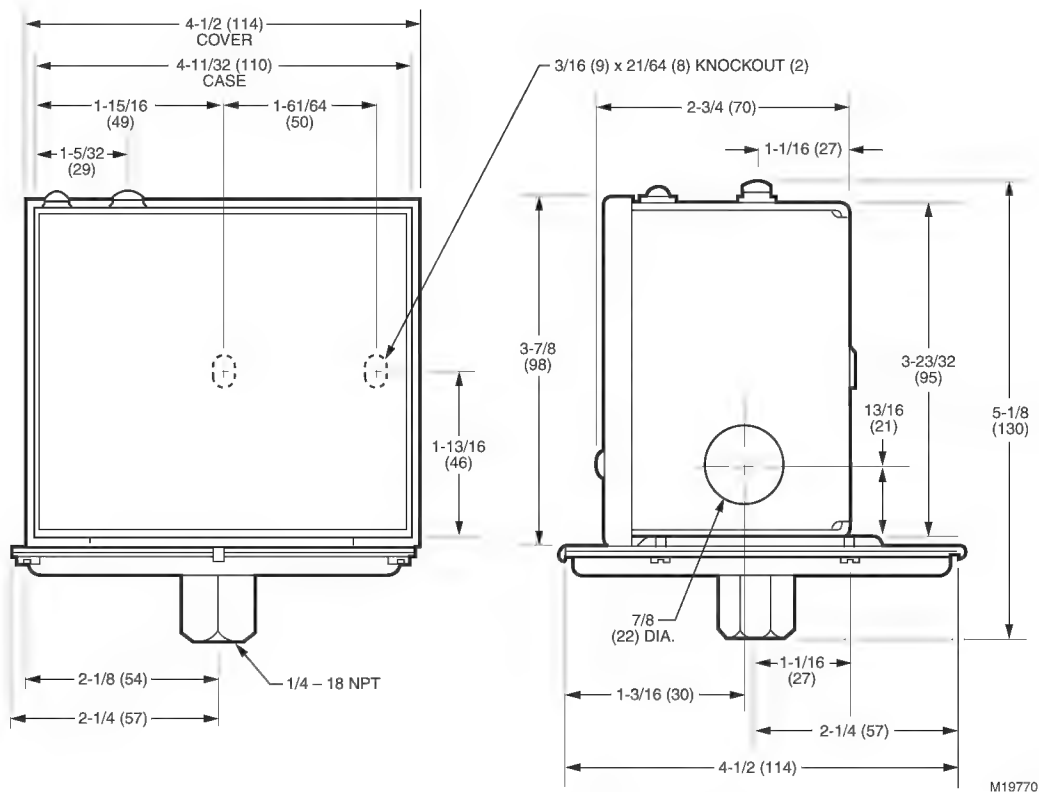
L408; L608 Vaporstat® Controllers



Provide operating control and automatic high limit protection for vapor heating systems with pressures up to 4 psi (8 kPa)

- Stainless steel diaphragm for use with liquids, air, noncombustible gases, ammonia, oxygen, distilled water and similar media.
- Provide dustproof, trouble-free mercury switching.
- Clear plastic cover allows observation of the pressure settings, leveling indicator and switch action.
- Include 14026 Siphon Loop.
- Integral plumb bob for accurate leveling at installation.
- Mount using hexagonal fitting with 1/4 in. NPT internal threads for direct mounting to the 14026 Steam Trap (siphon loop), which is included.

Dimension Diagrams



Application: Provide operating control and automatic limit protection for pressure systems with pressures up to 4 psi (8 kPa)

Differential Type: Subtractive

Mounting: 1/4 in. NPT internal thread or surface mount through back of case

Electrical Connections: Screw terminals

Piping Connections, Main or High Pressure: 1/4 in. NPT internal thread

Temperature Ratings: -35 F to 150 (-37 C to 66 C)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. 400-E-O

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Listed: File No. MP466, Guide No. MBPR

Switch Contact Ratings:

| | 120 Vac | 120 Vdc | 240 Vac | 240 Vdc |
|-------------|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| L408 | 8.0 AFL, 48.0 ALR, 10.0 A resistive | 2.4 AFL, 24.0 ALR, 5.0 A resistive | 5.1 AFL, 30.6 ALR, 5.0 A resistive | 1.0 AFL, 10.0 ALR, 2.0 A resistive |
| L608 | 8.0 AFL, 48.0 ALR, 10.0 A resistive | 2.0 AFL, 20.0 ALR, 8.0 A resistive | 5.1 AFL, 30.6 ALR, 5.0 A resistive | 1.0 AFL, 10.0 ALR, 2.0 A resistive |

Accessories:

33312B Pressure Control/Limits, Knurled Adjustment knob-with set screw. Fits head of main adjusting screw to permit adjusting without screwdriver.

4074BWJ Pressure Control/Limits, Limit Stop Assembly - to limit set point. Includes 129564 Range Stop, 107194 Range Stop Screw and 23466 Wrench.

| Product Number | Operating Pressure Range | | Pressure Differential | | Switch Operation | Switching Action | Includes |
|----------------|---|------------------|---|--------------------|------------------|---|-------------|
| | (psi) | (kPa) | (psi) | (kPa) | | | |
| L408A1132 | 0 oz/in ² to 16 oz/in ² | 0 kPa to 6.9 kPa | 2 oz/in ² to 16 oz/in ² | 0.9 kPa to 6.9 kPa | Auto recycle | SPST break on pressure rise | Siphon Loop |
| L408A1157 | 0 psi to 4 psi | 0 kPa to 28 kPa | 2 oz/in ² to 16 oz/in ² | 0.9 kPa to 6.9 kPa | Auto recycle | SPST break on pressure rise | Siphon Loop |
| L408B1131 | 0 oz/in ² to 16 oz/in ² | 0 kPa to 6.9 kPa | 2 oz/in ² to 16 oz/in ² | 0.9 kPa to 6.9 kPa | Auto recycle | SPST make on pressure rise | Siphon Loop |
| L408B1149 | 0 psi to 4 psi | 0 kPa to 28 kPa | 4 oz/in ² to 16 oz/in ² | 1.7 kPa to 6.9 kPa | Auto recycle | SPST make on pressure rise | Siphon Loop |
| L608A1046 | 0 oz/in ² to 16 oz/in ² | 0 kPa to 6.9 kPa | 4 oz/in ² to 16 oz/in ² | 1.7 kPa to 6.9 kPa | Auto recycle | SPDT break R-B, make R-W on pressure rise | Siphon Loop |
| L608A1053 | 0 psi to 4 psi | 0 kPa to 28 kPa | 4 oz/in ² to 16 oz/in ² | 1.7 kPa to 6.9 kPa | Auto recycle | SPDT break R-B, make R-W on pressure rise | Siphon Loop |

Pressure Controls and Limits Accessories

| OS Number | Description | Used With |
|--------------|---|---------------------|
| 14026 | Steam Trap Siphon Loop for L404, L604 and L91 | L404, L91, L604 |
| 106729 | C437, C637 Glass Lens, 6 in. diameter | C437, C637 |
| 106747 | C437, C637 Lens Retainer manufactured before 1973 | C437, C637 |
| 129178 | L404, L604, Plain Thermoplastic Cover, no labels or mounting screw | L404, L604 |
| 137632 | C437, C637 Paper Lens Gasket | C437, C637 |
| 139870 | C437, C637 Lens Gasket for Rainproof Models | C437, C637 |
| 112657A | C645 Mounting Bracket Assembly. (Includes screws) | C645 |
| 127120A | P455 Potentiometer | P455 |
| 137637B | Cover with Window - C645A | C645A |
| 137637C | Cover with Window - C645B | C645B |
| 139870A | C437, C637 Lens and Gasket for Rainproof Devices | C437, C637 |
| 15865AC | Mounting Bracket Assembly - C645A, B, D. | C645 |
| 209731A | Siphon Loop for P7810C, D | P7810C, P7810D |
| 23176CB | L91 Potentiometer - 135 ohm | L91 |
| 23176CF | L91 Potentiometer - 135 ohm | L91 |
| 32003039-001 | C6097 Lamp Kit, Position Indication | C6097 |
| 32003040-001 | C6097 Cover, Recycle Model | C6097 |
| 32003041-001 | C6097 Cover, Manual Reset Model | C6097 |
| 33312B | Pressure Control/Limits, Knurled Adjustment knob-with set screw. Fits head of main adjusting screw to permit adjusting without screwdriver. | L404, L604 |
| 4074BWJ | Pressure Control/Limits, Limit Stop Assembly - to limit set point. Includes 129564 Range Stop, 107194 Range Stop Screw and 23466 Wrench. | L404, L604 |
| 4074BWK | C437, C637 Surface Mounting Bracket and Self-Tapping Screw | C437, C637 |
| 4074EVP | P7810 Locking Door Wrench | P7810 |
| 4074EWD | P7810 Mounting Bracket and Mounting Screws (6) | P7810 |
| 110462/0021 | Mounting Bracket for Surface Mounting of C647A or C447A or C447B | C647A, C447A, C447B |
| 107194/0047 | Screw for L404 Range Stop | L404 |
| 118733/0021 | Retaining clip for C437 and C637 | C437, C637 |
| 129564/0021 | Range Stop for L404 | L404 |
| 23226D | L91 Wiper Blade Assembly | L91 |

Modernization and Replacement

For All Modernization and Replacement Applications, Follow the Instructions Below.

! CAUTION

Installer must be a trained, experienced, flame safeguard control service technician.

Disconnect power supply before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be involved.

All wiring must comply with applicable local electrical codes, ordinances, and regulations.

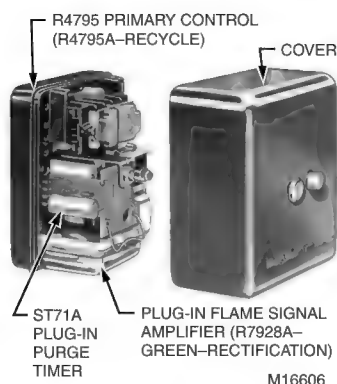
Voltage and frequency of the power supply and flame detector(s) connected to this control must agree with those marked on the device.

Loads connected to the control terminals must not exceed those listed in specification sheet for this product.

All external timers must be listed or component recognized by authorities having jurisdiction, for the specific purpose for which they are used.

Perform all required checkout tests after installation is complete.

RA890 and Fireye "M" Series Modernization



Modernize Honeywell RA890E,F,G and Fireye "M" Series relays.

- Use R4795 Primary Controls to provide proven prepurge period and recycle on flame failure.
- 9.8A burner motor contact rating for longer life; solid state circuitry for greater dependability.
- Mount on same Q270A Subbase as RA890, use same flame detector.
- Increase flexibility and reduce maintenance costs with field-replaceable, plug-in purge timers and flame signal amplifiers.
- Flame signal strength (μA) labeled on amplifier to reduce service time.
- All controls are listed by Underwriters Laboratories Inc.
- Three-second flame failure response time for increased safety.
- Plug-in components add versatility and reduce inventory and future replacement costs.

For complete Honeywell and competitive modernization information, refer to the Flame Safeguard System Modernization Survey and Proposal Form, in THE FIRING LINE, Honeywell form 70-8900. For information about THE FIRING LINE, see Training Materials section.

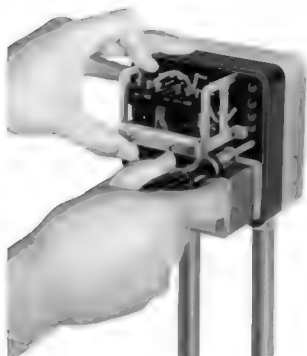
| Programmer/Relay to be Replaced/Modernized | Replacement Programmer | Plug-in Amplifier | Detector | Plug-in ^a Timer (recommended) |
|--|---|-------------------|--|--|
| RA890E,F | Use R4795A1016 for UL approved installations. | R7289A1004 | Use existing rectification detector. | ST71A1000 (7-sec delay for oil) |
| RA890G | | R7290A1001 | Use existing U.V. detector. | ST71A1018 (30-sec purge) |
| Fireye TFM Series ^b | | R7289A1004 | Use existing rectification detector. | ST71A1026 (60-sec purge) |
| Fireye UVM Series ^b | | R7290A1001 | Replace Fireye detector with C7027A1080 U.V. detector. | ST71A1034 (90-sec purge) ST71A1042 (10-sec purge) |

^a Many codes require 4 air changes during purge. Choose the timing needed to accomplish this (typically 30 seconds at high fire—open damper—or 90 seconds at low fire).

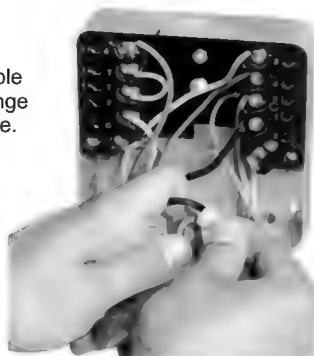
^b When replacing Fireye M-series programmers, a Q270A1024 subbase must be installed in place of the Fireye subbase.

INSTALLING AN R4795

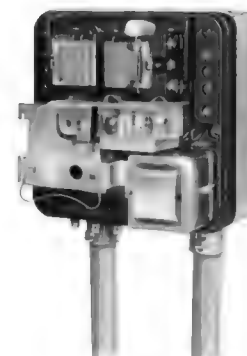
1
Disconnect power supply and remove RA890.



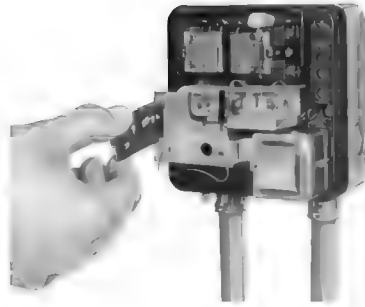
2
Make simple wiring change in subbase.



3
Install R4795.



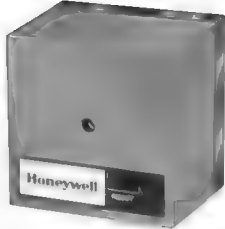
4
Plug in
ST71A
purge timer.



5
Plug in
R7289/R7290
amplifier



R7795 Primary Control



Provide flameout protection plus automatic control of commercial and industrial gas and oil burners.

- Meet requirements for gas burners with 400,000 to 2-1/2 million Btuh (117.2 to 732.8 kW) input. R7795C,D meet requirements to over 12-1/2 million Btuh.
- R7795A,B provide ignition cutoff and intermittent pilot.
- R7795C,D have interrupted pilot with delayed main valve.
- Includes terminals for connection of a line voltage airflow switch to prove airflow from the start of prepurge through the run period.
- Mount on Q795A Subbase with two captive screws.
- Provides all electrical connections between the device and subbase.
- Access to wiring terminals for testing.
- Integral solid state color-coded flame amplifiers.
- Field-selectable ten or four second trial for pilot flame ignition.
- Field-selectable recycle or lockout on flame failure.

Conversion Wiring Chart for R7795A-D

You can easily convert the following model primaries and programmers to the R7795A,B,C or D by following the step-by-step instructions listed below.

| | | |
|-----------|--------------|-------------------|
| Honeywell | RA890, R4795 | All 120 V models. |
| Fireye | M-Series | |

IMPORTANT: For on-off, gas-fired systems, some authorities having jurisdiction prohibit the wiring of any limit or operating contacts in series with the main fuel valve(s).

DIRECTIONS:

1. Disconnect all power to programmer.
2. Remove old programmer from subbase (trade-in to Honeywell Authorized Flame Safeguard Distributor).
3. Mark all wires on subbase; i.e., wires connected to terminal "1" should be marked "1." Disconnect wires as they are marked.
4. Remove old subbase.
5. Mount Q795A Subbase.
6. Connect wires to subbase per attached cross reference. Pay close attention to footnotes. For example: to convert a Fireye UVM-2 to a R7795, the wire marked "A" would connect to terminal #9 on the Q795. The wire marked "8" would connect to Q795 terminal #8.
7. A superscript letter, such as "a" designates a footnote. Study these footnotes carefully.
8. Plug in the R7795. Make sure you select the proper ST795A Purge Timer and Detector for the application.
9. There are 2 wires on the amplifier section of the R7795, which are used to select the desired trial for ignition timing and mode (lock-out or recycle). Refer to the R7795 instruction sheet (form 66-2001) for assistance with proper selection.
10. If a low voltage controller is used on the RA890 or UVM-1, remove it and replace it with a line voltage controller. The line voltage controller should be connected in series with the limits.
11. If a low voltage airflow switch is used on the R7795, it must be replaced with a line voltage airflow switch, such as the Honeywell C645.
12. The following models are recommended for replacements:

| Honeywell Device to be Replaced | Replace With | Fireye Device to be Replaced | Replace With |
|---------------------------------|--------------|------------------------------|--------------|
| RA890E,F | R7795B | TFM1,2,3H | R7795B |
| RA890G | R7795A | UVM1,2,3,3H | R7795A |
| R4795A,D/W-R7290 AMP | | UVM5 | R7795C |
| R4795A,D/W-R7289 AMP | R7795B | | |
| R4140P | R7795C,D | | |
| R4140Y | R7795A,B | | |

CONVERSION CHART FOR R7795 120 VOLT ONLY

| Q795 TERMINAL | L1 | L2 | 3 | 5 | 6 | 7 | 8 | 9 | 16 | 18 | F | G |
|-----------------------------------|----------------|----|----------------|----------------|---|---|------|---|----|----|-----------------|----|
| Programmer to be Converted | | | | | | | | | | | | |
| RA890 (All) | 1 ^a | 2 | b | 3 ^d | 5 | — | d,b | c | 6 | 4 | F | G |
| R4795 (All) | a | 2 | 6 ^b | 3 | 5 | — | 8, 7 | c | 1 | 4 | F | G |
| R4140P | L1 | L2 | P | 5 | 7 | 6 | M | A | 3 | — | S1 | S2 |
| R4140Y | L1 | L2 | 3 | 6 | 7 | — | 8 | 9 | 4 | 5 | F ^e | G |
| Fireye: UVM/TFM (All models)/MII | 1 | 1 | 6 | 3 | 5 | — | 8 | A | 7 | 4 | S2 ^f | S1 |
| UVM-1 (Prior to 1968) | a | 2 | b | 3 | 5 | — | d,b | A | 1 | 4 | S ^f | S |
| UVM-2 (Prior to 1968), All others | a | 2 | 6 | 3 | 5 | — | 8 | A | 1 | 4 | S ^f | S |

^a Connect power to terminal L1.

^b If no airflow switch is used, jumper Q795 terminal 3 to 8.

^c Replace low voltage alarm (if used) with line voltage alarm. Connect alarm directly to Q795 terminal 9.

^d On power burners, identify burner motor wire on terminal 3 and connect it to Q795 terminal 8.

^e R7795 uses only rectification or U.V. detectors. All other detectors must be converted to these types.

^f On UVM models, the detector must be changed to a Honeywell C7027 or C7035.

Modernization and Replacement

RM7895 On-Off Primary Control with Prepurge



Microprocessor-based integrated primary burner control for automatically fired gas, oil, or combination fuel single burner applications. Provides level of safety, functional capability and features beyond conventional controls.

- Functions include automatic burner sequencing, flame supervision, system status indication, system or self-diagnostics and troubleshooting.
- Subbase, amplifier, and prepurge timer are required for operation.
- Options include PC interface, keyboard display module, Data ControlBus™ Module, remote display module, first-out expanded annunciator, and Combustion System Manager™ software.
- Five LEDs provide sequence information.
- Interchangeable plug-in flame amplifiers.
- Optional local or remote annunciation of operation and fault information.
- Nonvolatile memory retains history files and sequencing status after power loss.
- Optional remote reset capability.
- Optional report generation.
- Selectable relight or lockout on loss of flame.
- Airflow switch check.

| | | |
|-----------|---------------------|-------------------|
| Honeywell | RA890, R4795, R7795 | All 120 V models. |
| Fireye | M-Series | |

IMPORTANT: For on-off, gas-fired systems, some authorities having jurisdiction prohibit the wiring of any limit or operating contacts in series with the main fuel valve(s).

DIRECTIONS:

1. Disconnect all power to programmer.
2. Remove old programmer from subbase (trade-in to Honeywell Authorized Flame Safeguard Distributor).

3. Mark all wires on subbase; i.e., wires connected to terminal "1" should be marked "1." Disconnect wires as they are marked.
4. Remove old subbase.
5. Mount Q7800A Subbase.
6. Connect wires to subbase per attached cross reference. Pay close attention to footnotes. For example: to convert a Fireye UVM-2 to a RM7895, the wire marked "A" would connect to terminal #9 on the Q7800. The wire marked "8" would connect to Q7800 terminal #8.
7. A superscript letter, such as "a" designates a footnote. Study these footnotes carefully.
8. Plug in the RM7895. Make sure you select the proper ST7800A Purge Timer and Detector for the application.
9. There are 2 wires on the amplifier section of the RM7895, which are used to select the desired trial for ignition timing and mode (lock-out or recycle). Refer to the RM7895 instruction sheet (form 66-1090) for assistance with proper selection.
10. If a low voltage controller is used on the RA890 or UVM-1, remove it and replace it with a line voltage controller. The line voltage controller should be connected in series with the limits.
11. If a low voltage airflow switch is used on the RM7895, it must be replaced with a line voltage airflow switch, such as the Honeywell C645.
12. The following models are recommended for replacements:

| Honeywell Device to be Replaced | Replace With | Amplifier |
|---------------------------------|--------------|----------------|
| RA890E,F | RM7895A | R7847A |
| RA890G | RM7895A | R7849A |
| R4795A,D/W-R7290 AMP | RM7895A | |
| R4795A,D/W-R7289 AMP | RM7895B | R7847A |
| R7795A | RM7895A | |
| R7795B | RM7895A | |
| R7795C | RM7895C | |
| R7796D | RM7895C | |
| R4140P | RM7895C | R7847A, R7849A |
| R4140Y | RM7895A | |
| Fireye Device to be Replaced | Replace With | Amplifier |
| TFM1,2,3H | RM7895A | R7847A |
| UVM1,2,3,3H | | R7849A |
| UVM5 | RM7895C | R7849A |

CONVERSION CHART FOR RM7895 120 VOLT ONLY

| Q7800 TERMINAL | L1 | L2 | 3 | 4 | 6 | 7 | 8 | 9 | 10 | 21 | F | G |
|-----------------------------------|----------------|----|---|------|----|----------------|----------------|---|----|----|-----------------|----|
| Programmer to be Converted | | | | | | | | | | | | |
| RA890 (All) | 1 ^a | 2 | c | b,d | 6 | b | 3 ^d | 5 | 4 | — | F | G |
| R4795 (All) | a | 2 | c | 8, 7 | 1 | 6 ^b | 3 | 5 | 4 | — | F | G |
| R7795A,B | L1 | L2 | 9 | 8 | 16 | 3 | 5 | 6 | 18 | — | F | G |
| R7795C,D | L1 | L2 | 9 | 8 | 16 | 3 | 5 | 6 | 18 | 7 | F | G |
| R4140P | L1 | L2 | A | M | 3 | P | 5 | 7 | — | 6 | S1 | S2 |
| R4140Y | L1 | L2 | 9 | 8 | 4 | 3 | 6 | 7 | 5 | — | F ^e | G |
| Fireye: UVM/TFM (All models)/MII | 1 | 1 | A | 8 | 7 | 6 | 3 | 5 | 4 | — | S2 ^f | S1 |
| UVM-1 (Prior to 1968) | a | 2 | A | b,d | 1 | b | 3 | 5 | 4 | — | S ^f | S |
| UVM-2 (Prior to 1968), All others | a | 2 | A | 8 | 1 | 6 | 3 | 5 | 4 | — | S ^f | S |

^a Connect power to terminal L1.

^b If no airflow switch is used, jumper Q7800 terminal 6 to 7.

^c Replace low voltage alarm (if used) with line voltage alarm. Connect alarm directly to Q7800 terminal 3.

^d On power burners, identify burner motor wire on terminal 3 and connect it to Q7800 terminal 4.

^e Select amplifier to match detector being used.

^f On UVM models, the detector must be changed to a Honeywell C7027 or C7035.

BC7000 'Blue Chip' Microcomputer Burner Control System

Intelligent microcomputer-based integrated control system for automatically fired commercial and industrial single burner applications. Requires a PM720G, L or M Program Module.



Dimensions, Approximate: 6 19/32 in. high, 7 11/16 in. wide, 5 1/8 in. deep (168 mm high, 196 mm wide, 130 mm deep)

Voltage: 120 Vac

Frequency: 50/60 Hz

Approvals:

Factory Mutual: Approved: Report No. J.I.1F6A1.AF (used with PM720L)

Required Components: PM720G, L, or M Program Module, Q520A Subbase, R7247, R7248, or R7249 Flame Signal Amplifier

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

123514B Flame Simulator, Simulates C7027, C7035, C7044

199037B Terminal Board Assembly

Q520A1089 Programmer Subbase

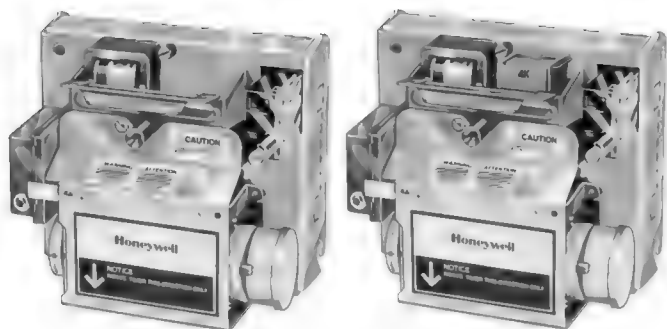
Q520A1121 Programmer Subbase

Q520E1002 Programmer Service Tool

| Product Number | Ambient Temperature Rating | | Comments |
|--------------------|----------------------------|-------------|---|
| | (F) | (C) | |
| BC7000L1000 | 32 F to 130 F | 0 C to 54 C | Timing and interlocks determined by PM720 G, L, M Program Modules |

Control System

R4140 Automatic Programming Control



Provide flameout protection and automatic sequencing for commercial and industrial single or dual fuel burners.

- Directly replace R4150 for most applications; mount on same Q520A Subbase as R4150.
- Provide safety shutdown on flame failure (lockout).
- Safe-start check.
- Include sequence burner motor, ignition, pilot valve and main fuel valves.

Dimensions, Approximate: 6 5/32 in. high, 7 3/16 in. wide, 5 5/8 in. deep (156 mm high, 183 mm wide, 143 mm deep)

AirFlow Check: User selectable

Humidity Range: 85% RH continuous, non-condensing

Voltage: 120 Vac

Frequency: 60 Hz

Power Consumption (with no output loads connected):

R4140G,M: 13W maximum

R4140L: 18W maximum

Vibration: 0.5 G environment

Weight (lb): 4 lb. 12 oz (2.15 kg)

Approvals:

Canadian Standards Association: Certified: File No. LR1620, Guide No. A-Z

Factory Mutual: Approved: Report No. 24180

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Component Recognized: File No. MP269, Guide No. MCCZ2, MCCZ

Required Components: Q520A Subbase, R7247, R7248, or R7249 Flame Signal Amplifier

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

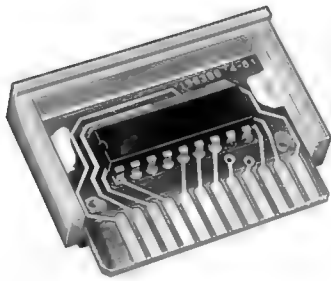
Q520A1089 Programmer Subbase

Q520A1121 Programmer Subbase

Q520E1002 Programmer Service Tool

| Product Number | Early Spark Termination | Flame Establishing Period | | Interlocks | Pilot Type | Pre-Purge | Pre-ignition | Post-Purge | Ambient Temperature Rating | | Comments |
|-------------------|-------------------------|---------------------------|--------|---|--------------|-----------|--------------|------------|----------------------------|---------------|--------------------|
| | | Main | Pilot | | | | | | (F) | (C) | |
| R4140G1064 | Yes, 5 sec | 10 sec | 10 sec | Start, Running and Low Fire | Intermittent | 60 sec. | No | 15 sec | -40 F to 150 F | -40 C to 66 C | Less Cover |
| R4140G1171 | Yes, 5 sec | 60 sec, 30 sec, 10 sec | 10 sec | Start, Running and Low Fire | Interrupted | 70 sec. | No | 25 sec | -40 F to 150 F | -40 C to 66 C | Less Cover |
| R4140G1189 | Yes, 5 sec | 4 sec, 10 sec | 10 sec | Pre-ignition, Running, and Low Fire | Interrupted | 60 sec. | Yes | 15 sec | -40 F to 150 F | -40 C to 66 C | Less Cover (GP201) |
| R4140L1089 | Yes, 5 sec | 4 sec, 10 sec | 10 sec | Pre-ignition, Lockout, Low Fire and High Fire | Interrupted | 60 sec. | Yes | 15 sec | -40 F to 130 F | -40 C to 54 C | Less Cover (GP301) |
| R4140L1147 | Yes, 5 sec | 15 sec, 30 sec, 10 sec | 10 sec | Pre-ignition, Lockout, Low Fire and High Fire | Interrupted | 60 sec. | Yes | 15 sec | -40 F to 130 F | -40 C to 54 C | Less Cover |
| R4140M1038 | Yes, 5 sec | 10 sec | 10 sec | Start and Running | Intermittent | 42 sec. | — | 15 sec | -40 F to 150 F | -40 C to 66 C | Less Cover |
| R4140M1053 | Yes, 5 sec | 10 sec | 10 sec | Start and Running | Intermittent | 90 sec. | — | 25 sec | -40 F to 150 F | -40 C to 66 C | Less Cover |
| R4140M1079 | — | 10 sec | 10 sec | Start and Running | Intermittent | 90 sec. | — | 25 sec | -40 F to 150 F | -40 C to 66 C | Less Cover |

PM720 Programming Module



Provides Sequencing Control for the BC7000.

- Plug-in program module for use with the BC7000L Microcomputer Burner Control.
- Determines Burner Sequence timings and features.
- Safe-start check.

AirFlow Check: User selectable

Frequency: 60 Hz

Approvals:

Canadian Standards Association: —

Factory Mutual: Reference BC7000

Required Components: Works with BC7000

| Product Number | Early Spark Termination | Flame Establishing Period | | Interlocks | Pilot Type | Pre-Purge | Pre-ignition | Post-Purge | Comments |
|----------------|-------------------------|---------------------------|--------|---|-------------|----------------|--------------|------------|------------------------|
| | | Main | Pilot | | | | | | |
| PM720G2005 | Yes, 5 sec | 30 sec, 10 sec | 10 sec | Pre-ignition, Running, and Low Fire | Interrupted | 40 sec. | Yes | 15 sec | — |
| PM720G2013 | Yes, 5 sec | 10 sec | 10 sec | Pre-ignition, Running, and Low Fire | Interrupted | 40 sec. | Yes | 15 sec | — |
| PM720L1030 | Yes, 5 sec | 15 sec, 10 sec | 10 sec | Pre-ignition, Lockout, Low Fire and High Fire | Interrupted | 30 sec. | Yes | 15 sec | — |
| PM720L2004 | Yes, 5 sec | 10 sec, 5 sec | 10 sec | Pre-ignition, Lockout, Low Fire and High Fire | Interrupted | 30 sec. | Yes | 15 sec | Energy Saving Sequence |
| PM720L2012 | Yes, 5 sec | 15 sec, 10 sec | 10 sec | Pre-ignition, Lockout, Low Fire and High Fire | Interrupted | 30 sec. | Yes | 15 sec | — |
| PM720L2020 | Yes, 5 sec | 15 sec, 10 sec | 10 sec | Pre-ignition, Lockout, Low Fire and High Fire | Interrupted | 10 sec. | Yes | 15 sec | — |
| PM720M2002 | Yes, 5 sec | 10 sec | 10 sec | Pre-ignition, Running, and Low Fire | Interrupted | 30 sec, 90 sec | Yes | 15 sec | — |
| PM720M2036 | Yes, 5 sec | 10 sec | 10 sec | Pre-ignition and Running | Interrupted | 30 sec., 7 sec | Yes | 15 sec | — |

Programmer Control Accessories

| OS Number | Description |
|-----------|---|
| 124731D | Terminal Strip, center |
| 129410 | Motor, Synchronized |
| 197446 | Fault Code Label |
| 199037B | Terminal Board Assembly |
| 202050C | Cover with Reset Button |
| 4074BZU | Bag Assembly including Adaptor, Cover Insert, 2 Plugs and #8-32 Screw |

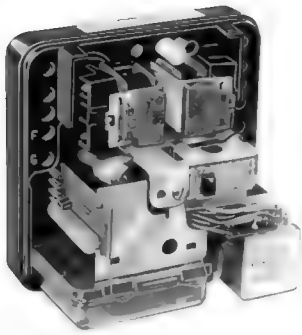
Q520 Subbase and Service Tool

Dimensions, Approximate: 6 5/32 in. high, 7 1/16 in. wide, 1 3/4 in. deep (156 mm high, 179 mm wide, 45 mm deep)

| Product Number | Comments |
|----------------|---|
| Q520A1089 | Includes 20 terminals |
| Q520A1121 | Includes 20 terminals |
| Q520E1002 | For burner system testing of most R4140 and BC7000. External terminal box connected to Q520E by 3 ft (0.9 m) cable with pin jacks corresponding to terminals on programmer. |

Controllers

R4795 Primary Controls



Provide solid state, electronic flame safeguard protection for commercial and industrial single or dual fuel burners.

- Use with rectification or ultraviolet type flame detectors depending on the interchangeable, plug-in amplifier being used.
- Recycle once after flame failure in attempt to re-establish pilot before lockout.
- Include manual push-to-reset safety switch in a dust-resistant enclosure.
- Includes spdt alarm contacts.

Dimensions, Approximate: 5 in. high, 5 in. wide, 4 3/4 in. deep, (127 mm high, 127 mm wide, 121 mm deep)

Alarm Relay Switching: SPDT

Power Consumption (at 60 Hz): Rectification: 6W maximum

Ultraviolet: 8.0W maximum

Safety Switch Timing: 15 sec nominal

Electrical Connections: Alarm contacts, male quick-connects. Screw terminals in Q270 Wiring Subbase

Purging Time: Determined by Plug -in Purge Timer

Temperature Ratings: -20 F to +105 F @ 50 Hz,

-20 F to +115 F @ 60 Hz

(-29 C to +40 C @ 50 Hz, -29 C to +46 C @ 60 Hz)

Approvals:

Canadian Standards Association: CSA Certified: 120V models only, includes -40 F models-File No. LR1620

Factory Mutual: Approved: Report No. 18774

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: UL Listed:120V w/ 30, 60, 90 sec

prepurge timers, includes -40 F models-File No.MP268, Guide No.

MCCZ; UL Comp. Recg.:120V w/ 7, 10 sec prepurge timers, includes

-40 F models-File No.MP268, Guide No.MCCZ2

Required Components: Mounting Base: Q270A1024;

Plug-in Amplifier: R7289A1004, R7289A1012, R7290A1001,

R7290A1019;

Plug-in Purge Timer: ST71A1000 (7 sec), ST71A1042 (10 sec),

ST71A1018 (30 sec), ST71A1026 (60 sec), ST71A1034 (90 sec).

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

123514B Flame Simulator, Simulates C7027, C7035, C7044

| Product Number | Electrical Ratings, Power Supply | | Description | Includes |
|----------------|----------------------------------|----------|---|-----------------------|
| | Vac | Hz | | |
| R4795A1016 | 120 Vac | 50/60 Hz | 120V 50/60 Hz less Amplifier and Prepurge Timer | female quick-connects |
| R4795A1040 | 220 Vac | 50/60 Hz | 220V 50/60 Hz less Amplifier and Prepurge Timer | female quick-connects |

R7795 Primary Controls



Provide solid state, electronic flame safeguard protection for commercial and industrial single or dual fuel burners.

- Include flame signal amplifiers that are color-coded: purple for ultraviolet and green for rectification.
- Require a plug-in prepurge timer of 1.5, 7, 10, 30, 60, or 90 seconds.
- mount on a Q795A Wiring subbase with two captive screws.
- Include line voltage airflow switch to prove airflow from the start of prepurge through the run period.
- Prevent start-up with lockout if flame or a flame simulating failure exists.
- Require manual reset after safety switch lockout.
- Field-selectable recycle or lockout on flame failure.

Dimensions, Approximate: 5 in. high, 5 in wide, 5 1/4 in. deep.

(127 mm high, 127 mm wide, 133.5 mm deep)

Application: Provides Flameout Protection plus Automatic control of Commercial and Industrial Gas and Oil Burners

Power Consumption: R7795A,C: 17 VA maximum

R7795B,D: 15 VA maximum

Alarm Relay Switching: 120Vac Output for Alarm

Safety Switch Timing: Electronic - 10 seconds, Mechanical - 15 seconds

Electrical Connections: Screw terminals in Q795 Wiring Subbase

Purging Time: Determined by Plug -in Purge Timer

Temperature Ratings: -40 F to +135 F (-40 C to +57 C)

Approvals:

Canadian Standards Association: Certified: File No. LR1620-681

Factory Mutual: Approved: Report No. J.I.OK389.AF

Industrial Risk Insurers: Acceptable

Underwriters Laboratories, Inc: Component Recognized: File No.

MP268, Guide No. MCCZ

Required Components: ST795 Prepurge Timer and Q795 Wiring Subbase

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

123514B Flame Simulator, Simulates C7027, C7035, C7044

| Product Number | Flame Failure Response Time | Electrical Ratings, Power Supply | | Description |
|----------------|-----------------------------|----------------------------------|----------|---|
| | | Vac | Hz | |
| R7795A1001 | 3 sec nominal | 120 Vac | 50/60 Hz | Full Function Primary Safety Control, Intermittent Pilot, Ultraviolet |
| R7795B1009 | 3 sec nominal | 120 Vac | 50/60 Hz | Full Function Primary Safety Control, Intermittent Pilot, Rectification |
| R7795C1007 | 3 sec nominal | 120 Vac | 50/60 Hz | Full Function Primary Safety Control, Interrupted Pilot, Ultraviolet |
| R7795D1005 | 3 sec nominal | 120 Vac | 50/60 Hz | Full Function Primary Safety Control, Interrupted Pilot, Rectification |

Products are available through authorized Honeywell distributors

RA890F Protectorelay® Primary Control



Dimensions, Approximate: 5 in. high, 5 in. wide, 4 3/4 in. deep (including subbase) (127 mm high, 127 mm wide, 121 mm deep (including subbase))

Application: Either a line or low voltage controller can be used

Power Consumption:

50 Hz: 8.5W maximum (17 VA maximum), Standby 3.0 W (13.6 VA)

60 Hz: 7W maximum (13 VA maximum), Standby 1.7 W (8.3 VA)

Alarm Relay Switching: SPDT

Safety Switch Timing: 15 seconds

Electrical Connections: Screw terminals in Q270 Wiring Subbase

Primary control provides solid state, electronic flame safeguard protection for industrial and commercial single or dual fuel burners.

- Uses rectification principle of electronic flame detection.
- Replaces RA890E in most applications; Mounts on same Q270A1024 Subbase.
- Recycles if flame signal lost while in Run. Failure to establish pilot results in a lockout. Safe-start check prevents start-up if flame-simulating failure occurs in flame detector circuit.
- Includes built-in protection against ignition crossover in flame rod systems.
- Includes spdt alarm contacts.
- Solid state circuitry.
- Mounts and removes easily through use of captive mounting screws.
- Mounting base is made of strong thermoplastic.

Temperature Ratings: 50 Hz models -20 F to +105 F, 60 Hz models - 20 F to +115 F

(50 Hz Models -29 C to +41 C, 60 Hz Models -29 C to +46 C)

Approvals:

Canadian Standards Association: CSA Certified: 120V models only; File No. LR1620

Factory Mutual: Approved: Report No. 17678,19417,19784

Underwriters Laboratories, Inc: UL Listed: 120V models only; File No. MP268, Guide No. MCCZ

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

| Product Number | Flame Failure Response Time | Electrical Ratings | | Description |
|----------------|-----------------------------|--------------------|----------------|---|
| | | Power Supply (Vac) | Frequency (Hz) | |
| RA890F1270 | 0.8 sec | 120 Vac | 50/60 Hz | Rectification, with alarm contacts |
| RA890F1288 | 3.0 sec | 120 Vac | 50/60 Hz | Rectification, with alarm contacts |
| RA890F1296 | 3.0 sec | 208 Vac | 50/60 Hz | Rectification, with alarm contacts |
| RA890F1304 | 0.8 sec | 220 Vac | 50/60 Hz | Rectification, with alarm contacts |
| RA890F1338 | 0.8 sec | 120 Vac | 50/60 Hz | Rectification, with alarm contacts |
| RA890F1346 | 3.0 sec | 120 Vac | 50/60 Hz | Rectification, with alarm contacts |
| RA890F1387 | 3.0 sec | 240 Vac | 50/60 Hz | Rectification, with alarm contacts |
| RA890F1478 | 0.8 sec | 120 Vac | 50/60 Hz | Rectification, with alarm contacts, fast safe start check |

Controllers

RA890G Protectorelay® Primary Control



Dimensions, Approximate: 5 in. high, 5 in. wide, 4 3/4 in. deep (including subbase) (127 mm high, 127 mm wide, 121 mm deep (including subbase))

Application: Either a line or low voltage controller can be used

Power Consumption:

50 Hz: 10W maximum (18 VA maximum), Standby 4 W (17 VA)

60 Hz: 9.5W maximum (14 VA maximum), Standby 3 W (12 VA)

Alarm Relay Switching: SPDT

Safety Switch Timing: 15 seconds

Temperature Ratings: 50 Hz models -20 F to +105 F, 60 Hz models -20 F to +115 F

(50 Hz Models -29 C to +41 C, 60 Hz Models -29 C to +46 C)

Primary control provides solid state, electronic flame safeguard protection for industrial and commercial single or dual fuel burners.

- Designed for interrupted ignition with intermittent pilot on gas burners, and interrupted or intermittent ignition on oil burners.
- Use with a C7027, C7035 or C7044 Minipeeper Ultraviolet Flame Detector for flame sensing.
- Relights once after flame failure in attempt to re-establish pilot before lockout.
- Solid state circuitry, eliminates warm-up and increases resistance to vibration.
- Includes spdt alarm contacts.
- Test jack permits reading of the flame signal.
- Mounts and removes easily through use of captive mounting screws.
- Mounting base is made of strong thermoplastic.

Power Consumption: 60 Hz - 9.5 W max (14 VA max) Standby 3W (12 VA)

50 Hz - 910 W max (18 VA max) Standby 4W (17 VA)

Approvals:

Canadian Standards Association: CSA Certified: 120V models only; File No. LR9S329

Control Safety Devices: Factory Mutual: Approved: Report No. 22013

Underwriters Laboratories, Inc: UL Listed: 120V models only; File No. MP268, Guide No. MCCZ

Accessories:

123514B Flame Simulator, Simulates C7027, C7035, C7044

Q270A1024 Wiring Mounting Base for RA890, R4795

| Product Number | Flame Failure Response Time | Electrical Ratings | | Description |
|----------------|-----------------------------|--------------------|----------------|----------------------------------|
| | | Power Supply (Vac) | Frequency (Hz) | |
| RA890G1229 | 0.8 sec | 120 Vac | 50/60 Hz | Ultraviolet, with alarm contacts |
| RA890G1245 | 0.8 sec | 220 Vac | 50/60 Hz | Ultraviolet, with alarm contacts |
| RA890G1260 | 3.0 sec | 120 Vac | 50/60 Hz | Ultraviolet, with alarm contacts |
| RA890G1286 | 3.0 sec | 240 Vac | 50/60 Hz | Ultraviolet, with alarm contacts |
| RA890G1302 | 3.0 sec | 220 Vac | 50 Hz | Ultraviolet, with alarm contacts |

FSP5075A1; FSP5075A3 Flame Amplifier Modules



Dimensions, Approximate: 4 7/8 in. high, 8 1/2 in. wide, 4 in. deep.
(124 mm high, 216 mm wide, 102 mm deep)

Temperature Ratings: -40 F to +140 F (-40 C to +60 C)

Approvals:

Control Safety Devices: Factory Mutual: Approved: Report No. 26098

Industrial Risk Insurers: Acceptable

Use electronic flame detection to provide continuous flame supervision from lightoff to shutdown.

- Solid state, color-coded, flame signal amplifier plugs into FSP5075A1 or FSP5075A3. (Order plug-in amplifiers separately.)
- Offer safe start check for a flame when starting burner.
- Include safety shutdown feature for loss of flame during run period or failure in flame detection system when a self-checking system is used.
- Removable cover allows easy access to amplifier, relays and terminal strip.
- Provide hermetically sealed relays for use in hostile environments.

Underwriters Laboratories, Inc: Component Recognized: File No. MP268, Guide No. MCCZ

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

123514B Flame Simulator, Simulates C7027, C7035, C7044

| Product Number | Flame Failure Response Time | Electrical Ratings | | | Product Used With | Description | Comments |
|----------------|----------------------------------|--------------------|----------------|-------------------------------------|---|------------------------|-----------------------------|
| | | Power Supply (Vac) | Frequency (Hz) | Power Consumption | | | |
| FSP5075A1 | Reference flame signal amplifier | 120 Vac | 60 Hz | 5.0 W running (max); 2.4 W standby. | R7247, R7248, R7249, or R7476 Flame Amplifier | Flame Amplifier Module | Relays Plastic Encapsulated |
| FSP5075A3 | Reference flame signal amplifier | 120 Vac | 60 Hz | 5.0 W running (max); 2.4 W standby. | R7247, R7248, R7249, or R7476 Flame Amplifier | Flame Amplifier Module | Relays Hermetically Sealed |

ST71 Prepurge Timer

Application: Prepurge Timer for R4795 Control Systems

Temperature Ratings: (-20 F to +115 F @ 50 Hz,
-20 F to +125 F @ 60 Hz
(-20 C to +46 C @ 50 Hz, -20 C to +52 C @ 60 Hz)

| Product Number | Purging Time | Description |
|----------------|--------------|--|
| ST71A1000 | 7 sec | Prepurge Timer for R4795 Control Systems |
| ST71A1018 | 30 sec | Prepurge Timer for R4795 Control Systems |
| ST71A1026 | 60 sec | Prepurge Timer for R4795 Control Systems |
| ST71A1034 | 90 sec | Prepurge Timer for R4795 Control Systems |
| ST71A1042 | 10 sec | Prepurge Timer for R4795 Control Systems |

ST795 Purge Timer

Application: Plug in Purge Timer for use with R7795 Full Function Primary Safety Control

Temperature Ratings: (-40 F to +135 F @ 60 Hz
-40 to +120 F @ 50 Hz)
(-40 C to +57 C @ 60 Hz, -40 C to +67 C @ 50 Hz)

| Product Number | Purging Time | Description |
|----------------|--------------|--|
| ST795A1007 | 1.5 sec | Prepurge Timer for R7795 Control Systems |
| ST795A1015 | 7 sec | Prepurge Timer for R7795 Control Systems |
| ST795A1023 | 10 sec | Prepurge Timer for R7795 Control Systems |
| ST795A1031 | 30 sec | Prepurge Timer for R7795 Control Systems |
| ST795A1049 | 60 sec | Prepurge Timer for R7795 Control Systems |
| ST795A1056 | 90 sec | Prepurge Timer for R7795 Control Systems |

Wiring Subbase

Primary Control Accessories

| Product Number | Description | Used With |
|----------------|---|--------------------------------|
| 106807 | Neon Bulb for Q518, Q519 | Q518, Q519 |
| 118702E | Remote Reset Cover for RA890F, G and R4795, 120V/50-60 Hz | RA890, R4795 |
| 122765 | Neon Bulb for remote First out for W688, Q518, Q519 | Q518, Q519 |
| 125133A | Connecting Cable 6' for remote "first out" indicating light, Q518, Q519 | Q518, Q519 |
| 125435 | Lamp socket for Remote First Out for W688, Q518, Q519 | Q518, Q519 |
| 198365B | Remote Reset Cover for Series 2 R7795A-D, (120V/60) | R7795A, R7795B, R7795C, R7795D |
| 202980 | Flame Relay for FSP5075A1 | FSP5075A1 |

Q270 Wiring Mount Base

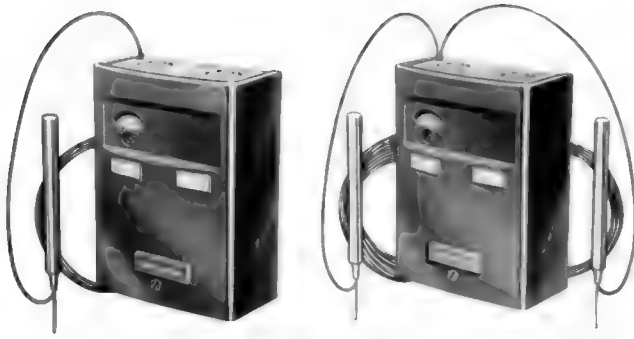
| Product Number | Product Used With | Description |
|----------------|-------------------|---------------------------------------|
| Q270A1024 | RA890, R4795 | Wiring Mounting Base for RA890, R4795 |

Q795 Wiring Subbases

| Product Number | Product Used With | Description |
|----------------|-------------------|---|
| Q795A1004 | R7795 | 4-side conduit box subbase with terminals intended to accept field wiring. For use with R7795 full function primary safety control. |
| Q795A1012 | R7795 | Subbase for wiring and mounting the R7795 in a Cabinet |

Modulating Reset Temperature Controller

T991E,F Proportional Temperature Controller



Provide both on-off and modulating control of water or air temperatures in ducts, tanks and similar applications.

- Micro Switch™ end switch cycles burner on and off at low fire; T991 then modulates burner as required.
- Designed for use with V9055; can be used with any series 90 motor.
- Ambient compensated.
- Set point adjustment on front of case.
- Switch makes 1 F (0.6 C) above end of throttling range.
- Mount using three holes in the back of the case.

Application: Provides on/off and modulating control of water or air temperature in ducts or tanks

Type: Remote bulb

Color: Gray

Electrical Connections: Screw terminals

Number of Sensors: 1

Analog Output: One 135 Ohm Potentiometer

Output: 1 spst

Sensor Element: Copper bulb

Throttling Range: 11 F (6 C)

Frequency: 50 Hz, 60 Hz

Replacement Parts:

See table on page 136

| Product Number | Bulb Size | | Capillary Length | | Maximum Operating Temperature | | Differential Temperature | | Setpoint Temperature Range | | Comments |
|----------------|-----------------------------------|-----------------------------|---------------------------------|-----------------------------|-------------------------------|-------|--------------------------|----------------|----------------------------|---------------|--|
| | (Inch) | (mm) | (ft) | (m) | (F) | (C) | (F) | (C) | (F) | (C) | |
| T991E1018 | 1/2 in. diameter, 4 3/16 in. long | 13 mm diameter, 107 mm long | 5 ft | 1.5 m | 280 F | 138 C | 4 F additive | 2.2 C additive | 160 F to 260 F | 71 C to 127 C | — |
| T991E1034 | 1/2 in. diameter, 4 3/16 in. long | 13 mm diameter, 107 mm long | 5 ft | 1.5 m | 200 F | 93 C | 4 F additive | 2.2 C additive | 55 F to 175 F | 13 C to 79 C | — |
| T991F1009 | 1/2 in. diameter, 4 3/16 in. long | 13 mm diameter, 107 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | 265 F | 129 C | 4 F additive | 2.2 C additive | 70 F to 140 F | 21 C to 60 C | Indoor bulb temperature plus outdoor bulb temperature must not exceed 265 F (129 C). |

Modulating Reset Temperature Controller

T678B; T991B Outdoor Reset Dual Bulb Temperature Controller



Analog Output: T991B (only): One 135 Ohm Potentiometer

Type: Remote bulb

Reset Ratio: 1.0 to 1.0

Number of Sensors: 2

Electrical Connections: Screw terminals

Voltage: 120 Vac

Frequency: 50 Hz, 60 Hz

Maximum Operating Temperature: 125 F (52 C)

Sensor Element: Copper bulb

Approvals:

Canadian Standards Association: Listed

Underwriters Laboratories, Inc: UL Listed: E4436, Vol. 4, Sec. 11, Guide XAPX

Contact Ratings:

| | 120 Vac | 240 Vac |
|--------------|-------------------|-------------------|
| T678B | 8.0 AFL, 48.0 ALR | 5.1 AFL, 30.6 ALR |
| T991B | — | — |

Automatic outdoor reset controllers for air or liquid.

- Raises heating medium control point automatically as outdoor temperature falls.
- One remote element senses heating medium, the other senses outdoor air temperature.
- T991 has 135 ohm potentiometer for proportional heating control.

Replacement Parts:

See table on page 136

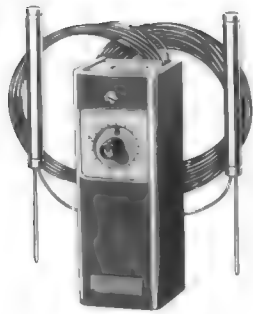
Application: Automatic reset based on outdoor temperature

| Product Number | Bulb Size | | Capillary Length | | Differential Temperature | | Setpoint Temperature Range | | Output | Comments |
|------------------|-------------------------------|-----------------------------|---------------------------------|-------------------------------|---|--|----------------------------|--------------|------------------------|---|
| | (inch) | (mm) | (ft) | (m) | (F) | (C) | (F) | (C) | | |
| T678B1006 | 1/2 in. x 4 in. | 13 mm dia., 102 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | Switch: 6 F fixed Interstage: 3 F to 10 F adjustable | Interstage: 1.7 C to 5.5 C adjustable Switch: 3.3 C fixed | 70 F to 140 F | 21 C to 60 C | 2 SPDT switch contacts | Indoor bulb temperature plus outdoor bulb temperature must not exceed 265 F (129 C). |
| T678B1014 | 1/2 in. x 4 in. | 13 mm dia., 102 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | Switch: 6 F fixed Interstage: 3 F to 10 F adjustable | Interstage: 1.7 C to 5.5 C adjustable Switch: 3.3 C fixed | 70 F to 140 F | 21 C to 60 C | 2 SPDT switch contacts | Indoor bulb temperature plus 1.5 times outdoor bulb temperature must not exceed 312 F (156 C). |
| T678B1022 | 1/2 in. x 4 in. | 13 mm dia., 102 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | Switch: 6 F fixed Interstage: 3 F to 10 F adjustable | Interstage: 1.7 C to 5.5 C adjustable Switch: 3.3 C fixed | 70 F to 140 F | 21 C to 60 C | 2 SPDT switch contacts | Indoor bulb temperature plus 0.67 times outdoor bulb temperature must not exceed 312 F (156 C). |
| T678B1030 | 1/2 in. x 4 in. | 13 mm dia., 102 mm long | Indoor: 18 ft., Outdoor: 20 ft. | Indoor: 5.5 m, Outdoor: 6.1 m | Switch: 6 F fixed Interstage: 3 F to 10 F adjustable | Interstage: 1.7 C to 5.5 C adjustable Switch: 3.3 C fixed | 70 F to 140 F | 21 C to 60 C | 2 SPDT switch contacts | Indoor bulb temperature plus outdoor bulb temperature must not exceed 265 F (129 C). |
| T991B1003 | 1/2 in. diameter, 4 in. long | 13 mm dia, 102 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | — | — | 70 F to 140 F | 21 C to 60 C | — | Indoor bulb temperature plus outdoor bulb temperature must not exceed 265 F (129 C). |
| T991B1011 | 1/2 in. diameter, 4 in. long | 13 mm diameter, 102 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | — | — | 70 F to 140 F | 21 C to 60 C | — | Indoor bulb temperature plus 1.5 times outdoor bulb temperature must not exceed 312 F (156 C). |
| T991B1029 | 1/2 in. diameter, 4 in. long | 13 mm diameter, 102 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | — | — | 70 F to 140 F | 21 C to 60 C | — | Indoor bulb temperature plus 2/3 times outdoor bulb temperature must not exceed 242 F (117 C). |
| T991B1037 | 1/8 in. diameter, 12 ft. long | 3 mm diameter, 3 m long | Indoor: 6 ft., Outdoor: 20 ft. | Indoor: 1.8 m, Outdoor: 6.1 m | — | — | 70 F to 140 F | 21 C to 60 C | — | Indoor bulb temperature plus outdoor bulb temperature must not exceed 265 F (129 C). |
| T991B1060 | 1/8 in. diameter, 12 ft. long | 3 mm diameter, 3 m long | Indoor: 20 ft., Outdoor: 30 ft. | Indoor: 6.1 m, Outdoor: 9.1 m | — | — | 50 F to 120 F | 10 C to 49 C | — | Indoor bulb temperature plus 0.29 times outdoor bulb temperature must not exceed 206 F (97 C). |

Products are available through authorized Honeywell distributors

Modulating Reset Temperature Controller

T475 Outdoor Reset Controller



Application: Automatically raises heating control setpoint as outdoor temperature falls

Type: Remote bulb

Color: Gray

Number of Sensors: 2

Electrical Connections: Screw terminals

Voltage: 120 Vac

Frequency: 50 Hz, 60 Hz

Sensor Element: Indoor and outdoor copper bulb

Operating controller for a hot water or warm air heating system.

- Used for line voltage, low voltage or millivolt (Powerpile) switching.
- Maintains proper balance between heating medium temperature and outdoor temperature.
- Raises heating medium control point automatically as outdoor temperature falls.
- Does not replace safety high limit control and is not for use in system requiring resetting above 71 F (21 C) outdoor temperature.

Output: 1 SPST

Approvals:

Underwriters Laboratories, Inc: Listed: E4436, vol. 4, Guide XAPX

Contact Ratings:

| | |
|-------------------|-------------------|
| 120 Vac | 240 Vac |
| 8.0 AFL, 48.0 ALR | 5.1 AFL, 30.6 ALR |

Replacement Parts:

See table on page 136

| Product Number | Bulb Size | | Capillary Length | | Differential Temperature | | Setpoint Temperature Range | | Comments | Includes |
|--------------------|---|--|---------------------------------|-----------------------------|--------------------------|-------------|----------------------------|--------------|-------------------|--|
| | (inch) | (mm) | (ft) | (m) | (F) | (C) | (F) | (C) | | |
| T475A1016 | indoor: 3/8 in. diameter, 3 9/16 long; outdoor: 3/8 in. diameter, 2 1/2 in. long | indoor: 9.5 mm diameter, 90 mm long; outdoor: 9.5 mm diameter, 64 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | 6 F to 20 F | 3 C to 11 C | 70 F to 140 F | 21 C to 60 C | 1.5:1 reset ratio | 34886A Outdoor Bulb Guard |
| • T475A1032 | indoor: 3/8 in. diameter, 3 9/16 long; outdoor: 3/8 in. diameter, 3 9/16 long | indoor: 9.5 mm diameter, 90 mm long; outdoor: 9.5 mm diameter, 90 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | 6 F to 20 F | 3 C to 11 C | 70 F to 140 F | 21 C to 60 C | 1:1 reset ratio | 34886A Outdoor Bulb Guard, 121371P Immersion Well Assembly |
| • T475A1057 | indoor: 3/8 in. diameter, 3 9/16 long; outdoor: 3/8 in. diameter, 5 5/16 in. long | indoor: 9.5 mm diameter, 90 mm long; outdoor: 9.5 mm diameter, 135 mm long | Indoor: 10 ft., Outdoor: 30 ft. | Indoor: 3 m, Outdoor: 9.1 m | 6 F to 20 F | 3 C to 11 C | 70 F to 140 F | 21 C to 60 C | 1:1.5 reset ratio | 34886A Outdoor Bulb Guard, 121371P Immersion Well Assembly |

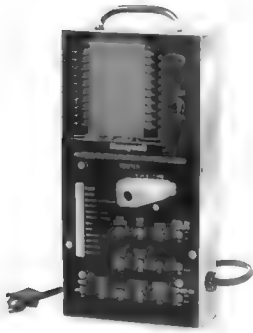
* TRADELINE models • SUPER TRADELINE models

Modulating Reset Temperature Controller

Reset Temperature Controller Accessories and Replacement Parts

| Product Number | Description | Used With |
|------------------|--|-------------------|
| 107324A | Capillary Holder Assembly for duct insertion, 8 3/8 in. long | T475A |
| 112620AA | Well Assembly., 3 3/4 in. (95 mm) insertion, 3/8 in. (10 mm) diameter, copper | T678B, T991B, E,F |
| 112620BB | Well Assembly., 5 1/2 in. (140 mm) insertion, 3/8 in. (10 mm) diameter, copper | T678B, T991B, E,F |
| 112620CB | Well Assembly., 5 1/2 in. (140 mm) insertion, 3/8 in. (10 mm) diameter, copper | T678B, T991B, E,F |
| 112622AA | Well Assembly., 4 in. (102 mm) insertion, 1/2 in. (13 mm) diameter, copper | T678B, T991B, E,F |
| 112624AA | Well Assembly., 4 3/4 in. (121 mm) insertion, 1/2 in. (13 mm) diameter, stainless steel | T678B, T991B, E,F |
| 112628AA | Well Assembly., 4 3/4 in. (121 mm) insertion, 1/2 in. (13 mm) diameter, stainless steel | T678B, T991B, E,F |
| 112630AA | Well Assembly., 4 1/4 in. (108 mm) insertion, 1/2 in. (13 mm) diameter, copper | T678B, T991B, E,F |
| 112634AA | Well Assembly., 4 1/4 in. (108 mm) insertion, 1/2 in. (13 mm) diameter, copper | T678B, T991B, E,F |
| 114509AA | Well Assembly., 5 1/2 in. (140 mm) insertion, 3/8 in. (10 mm) diameter, stainless steel | T678B, T991B, E,F |
| 121371A | Copper. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size:3 in. (76 mm) insertion, 1 1/2 in. NPT. Includes mounting clamp. | T678B, T991B, E,F |
| 121371B | Copper. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size:3 in. (76 mm) insertion, 1 1/2 in. (38 mm) insulation, 3/4 in. NPT. Includes mounting clamp. | T678B, T991B, E,F |
| 121371E | Stainless steel. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size:3 in. (76 mm) insertion, 1 1/2 in. (38 mm) insulation, 1/2 in. (13 mm) NPT. Includes mounting clamp. | T678B, T991B, E,F |
| 121371L | Copper. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size:3 in. (76 mm) insertion, 3 in. (76 mm) insulation, 1/2 in. NPT. Includes mounting clamp. | T678B, T991B, E,F |
| 121371M | Copper. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size:3 in. (76 mm) insertion, 1 1/2 in. (38 mm) insulation, 3/4 in. NPT. Includes mounting clamp. | T678B, T991B, E,F |
| 123869A | Copper. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size: 3 in. (76 mm) insertion, 1 1/2 in. (38 mm) insulation, 1/2 in. NPT. | T678B, T991B, E,F |
| 123870A | Copper. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size: 3 in. (76 mm) insertion, 1 1/2 in. (38 mm) insulation, 3/4 in. NPT. | T678B, T991B, E,F |
| 123872A | Copper. Bulb size: 3/8 in. x 3 in. (10 mm x 76 mm). Well size: 3 in. (76 mm) insertion, 3 in. (76 mm) insulation, 1/2 in. NPT | T678B, T991B, E,F |
| 124299AA | Copper. Bulb size: 3/8 in. (10 mm). Well size: 3 in. (76 mm) insertion, 1 1/2 in. (38 mm) insulation, 3/4 in. NPT. Includes set screw with spud for armored capillary with plug. | T678B, T991B, E,F |
| 311266D | Bulb Holder Assembly., T4031, use with copper elements only | |
| 7617ABY | Compression Fitting, brass 1/2 in. NPT plug | T678B, T991B, E,F |
| 7617M | Compression Fitting, brass 1/2 in. NPT plug | |
| 7640HX | Mounting Kit, controller and averaging element | T678B, T991B, E,F |
| Q615A1004 | Splash proof enclosure | T475A |

A7800 Tester



Provides quick operational check of the 7800 SERIES System components.

- Function switches and selectors simulate interlocks and control functions that allow 7800 SERIES devices to operate through sequences.
- Indicator lamps represent outputs as activated.

Accessories:

123514A Flame Simulator, Rectification Type Flame Amplifiers

| Product Number | Application | Required Components | Products used with | Comments |
|-------------------|---------------------------|--|---------------------------|------------------------------|
| A7800A1002 | Tester | Configuration Plugs: 203579A; 203579B; 203579C; 203579D; 203579E; 203579F; 203579G | 7800 SERIES Relay modules | — |
| 203579A | Tester Configuration Plug | — | RM7800; RM7840 | Configures A7800 and DSP2672 |
| 203579B | Tester Configuration Plug | — | RM7838A | Configures A7800 and DSP2672 |
| 203579C | Tester Configuration Plug | — | RM7838B,C | Configures A7800 and DSP2672 |
| 203579D | Tester Configuration Plug | — | RM7885 | Configures A7800 and DSP2672 |
| 203579E | Tester Configuration Plug | — | RM7890 | Configures A7800 and DSP2672 |
| 203579F | Tester Configuration Plug | — | RM7895; RM7896 | Configures A7800 and DSP2672 |
| 203579G | Tester Configuration Plug | — | RM7823 | Configures A7800 and DSP2672 |

7800 SERIES Demonstrators

Voltage: 120 Vac

Frequency (Hz): 50/60 Hz

| Product Number | Application | Required Components | Products used with | Comments | Includes |
|----------------|--------------|--|--|---|----------------------------|
| DSP2672 | Demonstrator | Configuration Plugs: 203579A; 203579B; 203579C; 203579D; 203579E; 203579F; 203579G | 7800 SERIES Relay modules | — | — |
| DSP3452 | Trainer | — | Primaries, Programmers and 7800 SERIES Relay Modules | Complete Flame Safeguard Training Package | 4 boards and utility cases |
| DSP3548 | Demonstrator | — | ControlLinks Fuel Air Ratio controls | — | — |

FSP1535 Tester



Provides quick operational check of Honeywell RA890 or R4795 non-programming primary controls.

- Includes indicator lights that visually represent functions of ignition, pilot and main valve as unit simulates system operation.
- Eliminates need to operate entire system.
- Tests units with rated voltage from 100 to 240, 50/60 Hz by connecting line cord to the rated voltage.

Voltage: 120/240 Vac

Frequency (Hz): 50/60 Hz

| Product Number | Application | Products used with |
|----------------|-------------|--------------------|
| FSP1535 | Tester | RA890; R4795 |

Testers and Demonstrators

FSP5004 Tester



Provides quick operational check of most Honeywell BC7000, R4140 and R4150 programmers and R7795 primary controls (order 198355A adapter separately).

- Includes indicator lights that visually represent control functions of programmer as unit simulates system operation.
- Works with 120 Vac, 60 Hz controls.
- Use to test some Gordon-Piatt programmers.
- Cannot be used to test some R4140 and R4150 models due to design or wiring differences. Reference the list at right to see if you have one of the controls that CANNOT be tested. If you do, check these out using the instructions provided in their respective instruction manuals.

Voltage: 120 Vac

Frequency (Hz): 50/60 Hz

| Product Number | Application | Products used with | Comments |
|----------------|-------------|----------------------|---|
| FSP5004 | Tester | BC7000; R4140; R7795 | DO NOT USE with: BC7000L1018, BC7000L1034, BC7000L1063; R4140D1004, R4140E1001, R4140M1079, or non-120 Vac R4140 models |

W136 Meter



Combination ac/dc voltmeter and dc microammeter used to test all flame safeguard controls and associated burner equipment. The W136A can be used to verify flame detector output is sufficient to operate the flame relay.

- Measure ac voltage of 0 to 300 Vac and dc voltages of 0 to 150 Vdc.
- Has 0 to 25 dc microamp scale for accurate checking of flame signal strength.
- Protective circuit prevents meter burnout on 25 uA or SPL settings.
- W136A1045 is in a black leather carrying case that holds meter and has compartment for storing test leads and accessories.
- The W136A1045 includes two push-on alligator clips that fit over probes and 196146 Cable Connector to plug into flame current jack and connect meter in series with flame current lead.
- The W136A1052 requires Cable Connector 196146 to be ordered separately.

Dimensions, Approximate: 8 1/2 in. high, 6 in. wide, 2 1/3 in. deep (216 mm high, 152 mm wide, 59 mm deep)

| Product Number | Application | Products used with | Comments | Includes |
|----------------|--------------------|--------------------------|---|---|
| W136A1045 | Analog Test Meter | Flame Safeguard Controls | Scale ranges: 0 to 300 Vac; 0 to 150 Vdc; 0 to 25 microamps | Two color-coded, 30 in. (762 mm) long pin jack probe. 196146 cable included |
| W136A1052 | Digital Test Meter | Flame Safeguard Controls | Scale ranges: 0 to 300 Vac; 0 to 150 Vdc; 0 to 25 microamps | Two color-coded, 30 in. (762 mm) long pin jack probe. Order 196146 cable separately |

Tester and Demonstrator Accessories

| Product Number | Application | Products used with | Comments |
|----------------|---|---|---|
| 121708 | Flame Simulator, Rectification Flame Amplifiers | R177; R180; R187; RA190A,B; R485A,B; R887; R890; RA890E,F,H,J,K; R7023A,B; R7289A | No test jack, or test jack in F circuit |
| 123514A | Flame Simulator, Rectification Flame Amplifiers | R4075B; R4181A; R4138A,B; R7253A; R8169B; R7257A; R7247A; R7847A | Test jack in G circuit |
| 123514B | Flame Simulator, Ultraviolet Flame Amplifiers | RA890G; R7290A; R7255A; R7259A; R7249A | Simulates Minipeeper Flame Detectors |
| 198355A | Adapter for R7795, used with FSP5004 | BC7000; R4140; R7795 | |
| 203659 | Flame Simulator, Ultraviolet Flame Amplifiers | RA890G; R7795A,C,E,G; R7290; R7255B; R7259A; R7249A r7849a, b | Simulates Minipeeper Flame Detectors |

S445A Start-Stop Switch



Pushbutton switch for manually operated oil or gas burner sequencing relays such as RM7885 and RM7838.

- Use with Primary Safety Controls.
- Provides remote start-stop manual control.
- Fully enclosed for minimum maintenance.

| Product Number | Description | Dimensions, Approximate | | Comments | Used With |
|----------------|-------------------|--|--------------------------------------|----------------|---|
| | | (inch) | (mm) | | |
| S445A1010 | Start-Stop Switch | 2-1/2 in. wide, 4-3/8 in high, 2-15/16 in. deep. | 64 mm wide, 111 mm high, 75 mm deep. | 120Vac 50/60hz | EC7885A1011, EC7885A1029, RM7838A1014, RM7838B1013, RM7885A1015 |

Low Water Cut Off Probe Extender

| Product Number | Description | Dimensions, Approximate | | Used With |
|----------------|---|-------------------------|-----------------|-----------|
| | | (inch) | (mm) | |
| 193568 | Probe Extender for QW700, 6 inch uninsulated | 6 in. | 152 mm diameter | QW700 |
| 193569 | Probe Extender for QW700, 12 inch uninsulated | 12 in. | 304 mm long | QW700 |
| 193570 | Probe Extender for QW700, 18 inch uninsulated | 18 in. | 457 mm long | QW700 |
| 193571 | Probe Extender for QW700, 24 inch uninsulated | 24 in. | 609.6 mm long | QW700 |
| 193583 | Probe Extender for QW700, 36 inch uninsulated | 36 in. | 914.4 mm | QW700 |
| 195303A | Probe Extender for QW700, 6 inch insulated | 6 in. | 152 mm long | QW700 |
| 195304A | Probe Extender for QW700, 12 inch insulated | 12 in. | 304 mm long | QW700 |
| 195305A | Probe Extender for QW700, 18 inch insulated | 18 in. | 457 mm long | QW700 |
| 195306A | Probe Extender for QW700, 24 inch insulated | 24 in. | 609.6 mm long | QW700 |
| 195307A | Probe Extender for QW700, 30 inch insulated | 30 in. | 762 mm long | QW700 |
| 195308A | Probe Extender for QW700, 36 inch insulated | 36 in. | 914.4 mm long | QW700 |

General Information

Order Specification Number System

TYPE LETTER

V

The type letter is the single letter, or two letter group, which begins the model number. This letter usually indicates the general type of device involved, however, some product model numbers may not follow these designations exactly. If you have questions about a particular product designation, please contact your Honeywell sales representative. A list of type letters used is shown below (some may fit in more than one category):

| | |
|---------|--|
| A | — Testers. |
| AT | — Transformers. |
| BC | — Microcomputer burner control system. |
| C or CS | — Combustion controls; sensors. |
| D or DM | — Dampers. |
| DSP | — Demonstrators. |
| EL | — Lighting controls. |
| ER | — Energy recovery ventilators. |
| F | — Electronic air cleaners. |
| H | — Humidity controls, including combination temperature and humidity controllers. |

TYPE NUMBER

4055

SUFFIX LETTER

A

| | |
|-----------------|--|
| L, LA or LS | — Limit controllers. |
| M | — Motors. |
| P | — Pressure controllers. |
| PM | — Program modules. |
| Q | — Accessories. |
| QS | — Communication interface modules. |
| R, RA or RW | — Relays. |
| RM | — Primary controls. |
| S | — Switches and ignition modules. |
| ST | — Electronic fan timers. |
| SV | — Integrated controls. |
| T, TA or TS | — Thermostats and remote bulb temperature controllers. |
| TG | — Thermostat guards. |
| V, VR, VS or VW | — Valves. |
| W | — Load control panels, accessories. |
| Y | — Package sets. |
| ZM | — Software packages. |

OS NUMBER

1007

Summary of Honeywell Control Series Designations

| Series Designation | Controller Type | Controller Action | Relay or Valve Type | Motor Action | Example |
|--------------------|------------------------------------|---|--|---|-------------------|
| Series 20 | 3-wire, low voltage (2-position) | Makes circuit to start; makes second circuit to stop. | — | Low voltage; rotates 180 to open, continues 180 to close; stops on power interruption. | V2045 |
| Series 40 | 2 wire, line voltage (2-position) | Makes circuit to start; breaks it to stop. | Line voltage coil circuit; makes (opens) when powered; breaks (closes) when power interrupted. | Line voltage; motor drives open when powered; spring returns on power interruption. | T42, L4064, L4008 |
| Series 50 | Mechanical (nonelectrical) series. | | | | V5011 |
| Series 60 | 3-wire, line voltage (2-position) | Makes circuit to start; makes second circuit to stop. | — | Old style—line voltage equivalent to series 20. New style—line or low voltage drives open when powered open; reverses and drives closed when powered closed; stops on power interruption. | M6284 |
| Series 70 | Electronic series. | | | | M7285, C7031 |
| Series 80 | 2-wire, low voltage (2-position) | Makes circuit to start; breaks it to stop. | Low voltage coil circuit; makes (opens) when powered; breaks (closes) when power interrupted. | Low voltage; motor drives open when powered; spring return closed on power interruption. | T87, L8124 |
| Series 90 | 3-wire, low voltage (modulating) | Varies resistance between common terminal and two end terminals in response to controlled variable. | — | Low voltage; motor modulates position in response to changes in controlled variable signaled by controller. | T921, M9164, W899 |

Approval Bodies

Most of the devices described in this catalog have been approved or listed by one or more of the approval bodies listed below.

Underwriters Laboratories Inc.

Underwriters Laboratories Inc., is a nonprofit organization that examines and tests devices, systems and materials. Its membership represents a broad cross section of industry, education, and government.

Field inspectors for Underwriters Laboratories Inc., do not normally inspect equipment installed on job sites, but restrict their activities entirely to periodic inspections of products coming off manufacturers' assembly lines.

The three general categories of acceptance of a product by Underwriters Laboratories Inc., are:

1. General listing.
2. Component recognized.
3. Classification.

General listed devices are structurally and functionally complete and suitable for field installation.

Component recognized devices are incomplete in some way that makes them unsuitable for general field installation. They are intended to be factory installed as part of some other piece of equipment. Classified devices or products have been evaluated as to specific hazards only.

Canadian Standards Association

The Canadian Standards Association is a nonprofit, nongovernmental organization which provides a national standardizing body for Canada.

The Canadian Standards Association Testing Laboratories, inaugurated in May 1940, is a division of the Canadian Standards Association, and is recognized as a testing and investigating agency by Inspection Authorities and by Fire Marshalls and Fire Commissioners throughout Canada.

The Canadian Standards Association Laboratories test and examine electrical products submitted for approval in compliance with pertinent Canadian Standards Association codes and standards.

The Canadian Standards Association now includes International Approval Services (IAS).

International Approval Services—U.S.

IAS is the testing organization of the American gas industry with laboratories in Cleveland, Ohio and Irvine, Calif. The IAS sponsors the American National Standards Institute Z21 and Z83 Committees on standards for gas-fired equipment.

Any manufacturer of gas appliances or gas appliance accessories may submit their products to the Laboratories and secure certification of their designs upon compliance with the appropriate national standards. Upon such compliance, the manufacturer is granted an Appliance Cer-

tificate or an Accessory Certificate and is permitted to display the trademarked Laboratories' Certification Seal or trademarked Laboratories' Certification Symbol on the appliance or accessory.

International Approval Services—Canada

IAS represents all segments of the Canadian gas industry, has been accredited by the Standards Council of Canada and the Standards Advisory Committee to prepare National Standards in the area of equipment for use with natural gas and propane. IAS has laboratories in Toronto, Canada.

Each standard is intended to be used within the scope of the standard by the manufacturing sector, those applying the equipment or those responsible for its application. It is the responsibility of the user to determine in each case that the standard is suitable for the application.

IAS operates a certification program for gas appliances, equipment, and accessories.

Factory Mutual

Factory Mutual is an association of mutual insurance companies dedicated to loss prevention. Through its research arm, the Factory Mutual Research Corporation, it investigates means of preventing and minimizing fire and other losses. Factory Mutual Laboratories test and approve two broad categories of devices and materials:

1. Those used for the control or prevention of property damage.
2. Those that in themselves would present serious hazards if not properly designed.

Factory Mutual Acceptance refers to a specific installation or arrangement of equipment. Installations using approved devices, if found satisfactory following review of plans and inspection of completed work, are "accepted".

A continuing follow-up program is carried out through periodic plant inspections and reports of performance in actual use.

Industrial Risk Insurers

Industrial Risk Insurers (formerly FIA) is composed of member stock insurance companies, concerned with all phases of fire protection and other perils insured against by its members.

Generally, Industrial Risk Insurers accepts Underwriters Laboratories Inc., listing as evidence of device acceptability, but approves or disapproves each job on its own merits including:

1. Oven, dryer, furnace or boiler construction.
2. Flame safeguard control systems.
3. Fire protection equipment, sprinkler and alarm systems, etc.

Inspectors are located in field offices in major cities.

The home office is in Hartford, Conn., where a laboratory is maintained.

Reference Information

Date Code

A date code is stamped on each device to identify the date of manufacture.

In October 1975, Honeywell adopted the industry standard date code system of a 4-digit code. The first 2 digits indicate the year; the second 2 digits indicate the week of the year. EXAMPLE: 7812—the last week of March 1978.

For devices manufactured before October 1975, the following date code was used. If the letter "R" is added as a third letter, it indicates a repair date.

| | | | |
|------------|-------------|--------|--------|
| A January | G July | H 1962 | Z 1970 |
| B February | H August | G 1963 | Y 1971 |
| C March | I September | F 1964 | X 1972 |
| D April | J October | E 1965 | W 1973 |
| E May | K November | D 1966 | V 1974 |
| F June | L December | C 1967 | U 1975 |
| | | B 1968 | T 1976 |
| | | A 1969 | |

Terms of Payment and Prices

Contact your local Honeywell TRADELINE Wholesaler or Authorized Distributor for your discount and terms of payment.

Horsepower Ratings

Ratings of Honeywell controls listed herein are in amperes, and correspond generally to the values for various horsepower as shown in this chart. Full load ratings are taken from the National Electrical Code, 1978 edition; locked motor ratings are 6 times full load rating (ac) or 10 times full load rating (dc).

| Approximate Horsepower | 120V | | 240V | |
|------------------------|--------------|----------------|--------------|----------------|
| | Full Load | Locked Rotor | Full Load | Locked Rotor |
| 1/6 ac dc | 4.4 — | 26.4 — | 2.2 — | 13.2 — |
| 1/4 ac dc | 5.8 3.1 | 34.8 31.0 | 2.9 1.6 | 17.4 16.0 |
| 1/3 ac dc | 7.2 4.1 | 43.2 41.0 | 3.6 2.0 | 21.6 20.0 |
| 1/2 ac dc | 9.8 5.4 | 58.8 54.0 | 4.9 2.7 | 29.4 27.0 |
| 3/4 ac dc | 13.8 7.6 | 82.8 76.0 | 6.9 3.8 | 41.4 38.0 |
| 1 ac dc | 16.0 9.5 | 96.0 95.0 | 8.0 4.7 | 48.0 47.0 |
| 1-1/2 ac dc | 20.0 13.2 | 120.0 132.0 | 10.0 6.6 | 60.0 66.0 |
| 2 ac dc | 24.0 17.0 | 144.0 170.0 | 12.0 8.5 | 72.0 85.0 |
| 3 ac dc | 34.0 25.0 | 204.0 250.0 | 17.0 12.2 | 102.0 122.0 |

Taxes

The amount of any and all present or future taxes or other government charges upon the production, shipment, installation or sale of the equipment covered hereby, including use or occupation taxes, shall be added to the price and paid by the Purchaser; or in lieu thereof, the Purchaser shall furnish the Company with a tax-exemption certificate acceptable to the taxing authorities.

International Controls

Some Honeywell controls are available with Celsius scales and/or at 110/220V, 50 Hz. For information on the availability of these devices, contact:

Burner and Boiler Controls and Systems
Honeywell International Inc., MN10-2497
1985 Douglas Drive North
Golden Valley, MN 55422-3992

All other controls and systems:
International Marketing MN10-2523
Honeywell International Inc.
1985 Douglas Drive North
Golden Valley, MN 55422-3992

All motors do not necessarily come within the maximum ampere ratings shown in the table, and control devices must be used which have a rating equal to, or greater than, the actual motor running and starting currents.

NEMA Standard Classification Code for Flame Safeguard Enclosures

NEMA 1—General purpose. for indoor protection, where conditions are not unusually severe.

NEMA 2—Driptight. Designed to exclude falling moisture or dirt. Particularly applicable to cooling rooms, laundries, etc., where condensation is prevalent. For indoor use.

NEMA 3—Weather Resistant (weatherproof). For outdoor use; designed to withstand all normal exposure to natural elements. Controls mounted on pullout racks for easy access. With rain hood and weather seals.

NEMA 4—Watertight. Withstands water pressure from 1 in. hose nozzle, 65 gallons per minute, from distance of not less than 10 ft for five minutes. Suitable for maritime applications, breweries, etc.

NEMA 5—Dust-tight. Equipped with dust-tight gaskets. Suitable for mills and other high-dust atmospheres.

NEMA 6—Submersible. For submerged operation under specified pressures and time.

NEMA 7—Hazardous Locations, National Electrical Code Class 1 (circuit breaks in air).

NEMA 8—Hazardous Locations, National Electrical Code Class 1 (circuit breaks immersed in oil).

NEMA 9—Hazardous Locations, National Electrical Code Class 2.

NEMA 10—Explosion-proof. Meets U.S. Bureau of Mines requirements for explosive atmospheres.








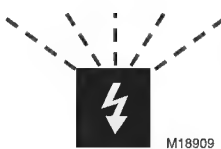


NEMA 11—Acid or Fume Resistant. Provides for immersion of enclosed equipment in oil.

NEMA 12—Industrial Use. Excludes oils, dust, moisture, to satisfy individual requirements.

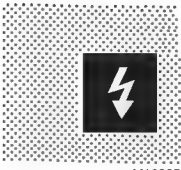
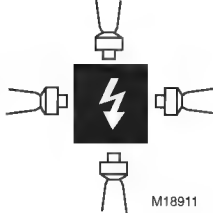
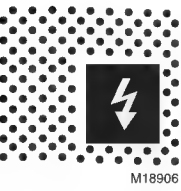

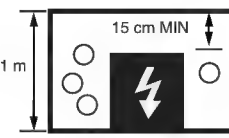
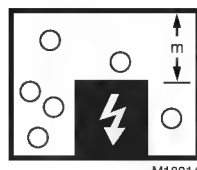
IP Standard Classification

- The IP classification system is used to indicate the degree of protection provided by the housings of electrical products operating on low and middle voltages (up to 1000 V ~ and 1500 V =).

- A classification consists of the letters IP followed by two digits which indicate conformity with test conditions as defined in the table below.

| First Digit | | Second Digit | |
|----------------------------------|---|--------------------------|---|
| Protection against Solid Objects | | Protection against Water | |
| IP | Tests | IP | Tests |
| 0 |  M18900 No special protection | 0 |  M18900 No special protection |
| 1 |  M18901 A large surface of the body, such as a hand (but no protection against deliberate access). Solid objects exceeding 50 mm in diameter. | 1 |  M18907 Dripping water (vertically falling drops) shall have no harmful effect. |
| 2 |  M18902 Fingers or similar objects not exceeding 80 mm in length. Solid objects exceeding 12 mm in diameter. | 2 |  M18908 Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position. |
| 3 |  M18903 Tools, wires etc., of diameter or thickness greater than 2.5 mm. Solid objects exceeding 2.5 mm in diameter. | 3 |  M18909 Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect. |
| 4 |  M18904 Wires or strips of thickness greater than 1.0 mm. Solid objects exceeding 1.0 mm in diameter. | 4 |  M18910 Water splashed against the enclosure from any direction shall have no harmful effect. |

Reference Information

| First Digit | | Second Digit | |
|----------------------------------|--|--------------------------|--|
| Protection against Solid Objects | | Protection against Water | |
| IP | Tests | IP | Tests |
| 5 |  <p>Ingress of dust is not totally prevented by dust does not enter in sufficient quantity to interfere with satisfactory operation of the equipment.</p> | 5 |  <p>Water projected by a nozzle against the enclosure from any direction shall have no harmful effect.</p> |
| 6 |  <p>No ingress of dust</p> | 6 |  <p>Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.</p> |
| | | 7 |  <p>Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time.</p> |
| | | 8 |  <p>The equipment is suitable for continuous submersion in water under conditions which shall be specified by the manufacturer.</p> <p>NOTE: Normally, this will mean that the equipment is heretically sealed. However with certain types of equipment it can mean that water can enter but only in such a manner that it produces no harmful effects.</p> |

Conversion of Pressure Units

(Convert by multiplying value in known pressure units by factor listed under required pressure unit.)

| Known Pressure Unit | Required Pressure Unit | | | | | | | | |
|------------------------|------------------------|-------------------|-------------------|------------------------|---------------------|-----------------|-------------------|---------------|----------------------|
| | Kilo-pascals | Pounds per sq in. | Ounces per sq in. | Millimeters of Mercury | Kilograms per sq cm | Inches of Water | Inches of Mercury | Feet of Water | Centimeters of Water |
| Centimeters of Water | 0.0981 | 0.0142 | 0.227 | 0.735 | 0.000999 | 0.394 | 0.0289 | 0.0328 | — |
| Feet of Water | 2.99 | 0.433 | 6.94 | 22.4 | 0.0305 | 12.0 | 0.883 | — | 30.5 |
| Inches of Mercury | 3.39 | 0.491 | 7.86 | 25.4 | 0.0345 | 13.6 | — | 1.13 | 34.6 |
| Inches of Water | 0.249 | 0.0361 | 0.578 | 1.87 | 0.00254 | — | 0.0735 | 0.0833 | 2.54 |
| Kilograms per sq cm | 98.1 | 14.2 | 228.0 | 735.0 | — | 394.0 | 29.0 | 32.8 | 1000.0 |
| Millimetres of Mercury | 0.133 | 0.0193 | 0.308 | — | 0.00136 | 0.535 | 0.0394 | 0.0446 | 1.36 |
| Ounces per sq in. | 0.431 | 0.0625 | — | 8.24 | 0.00439 | 1.73 | 0.128 | 0.144 | 4.40 |
| Pounds per sq in. | 6.89 | — | 16.0 | 51.7 | 0.0703 | 27.7 | 2.04 | 2.31 | 70.4 |
| Kilopascals | — | 0.145 | 2.32 | 7.52 | 0.010 | 4.02 | 0.295 | 0.334 | 10.2 |

Absolute Pressure = Gauge Pressure +14.74 psi.

Capacities

Most gas capacities listed in this catalog are stated for natural gas, based on 1,000 Btu per cu ft, 0.64 sp. gr. nat. gas, at a pressure drop of 1.0 in. w.c. (37.3 MJ/m³, 0.64 sp. gr. at a pressure drop of 0.25 kPa).

To calculate the Btu/h capacity for other gases, multiply the listed Btu/h capacity by the conversion factor.

| Total Heating Value for Gas X | | At sp. gr. | Conversion Factor (multiply) |
|-------------------------------|-------------------|---------------|------------------------------|
| Btu/cu ft | MJ/m ³ | | |
| 500 to 800 | 18.7 to 29.8 | 0.60 | 0.516 ^a |
| 800 to 950 | 29.8 to 35.4 | 0.70 | 0.765 ^a |
| 2500 | 93.3 | 1.53 (LP gas) | 1.62 |

^a Nominal conversion factor for range of total heat value.

For gases not listed in table, use one of the following formulas:

$$\left(\frac{\text{Listed Btu/h Capacity}}{(0.64 \text{ sp. gr.})} \right) \left(\sqrt{\frac{0.64}{\text{sp. gr. gas X}}} \right) \left(\frac{\text{Btu/cu ft (MJ/m}^3 \text{ gas X)}}{1000 \text{ Btu/cu ft (37.3 MJ/m}^3)} \right) = \text{Btu/h Capacity gas X}$$

or

$$\left(\frac{\text{Btu/h Capacity (gas A)}}{(\text{gas A})} \right) \left(\sqrt{\frac{\text{sp. gr. gas A}}{\text{sp. gr. gas B}}} \right) \left(\frac{\text{Btu/cu ft (MJ/m}^3 \text{ gas B)}}{\text{Btu/cu ft (MJ/m}^3 \text{ gas A)}} \right) = \text{Btu/h Capacity gas B}$$

M18317

Power & Heat

| | |
|---------------------|---|
| 1 Btu | 776 ft-lb 0.293 Watt-hr 252 cal |
| 1 cal | 0.003968 Btu 0.0011619 Watt-hr |
| 1 Btu/h | 0.293 Watt 4.2 cal/min |
| 1 Watt | 3.413 Btu/h |
| 1 Watt-hr | 3.413 Btu |
| 1 kW (1000 Watts) | 3413 Btu/h |
| 1 kW-hr | 3413 Btu |
| 1 hp | 0.746 kW 2544.65 Btu/h 33,000 ft-lb./min |
| 1 Bohp ^a | 9.809 kW 33,479 Btu/h 34.5 lb of steam per hour |

^a Boiler Output Horsepower is the equivalent of the heat required to evaporate 34.5 lb of water per hour into dry, saturated steam at 212 F.

Btu Contents of Fuels

| Grade or Type | Unit | Btu |
|---------------|--------|--------------|
| No. 1 Oil | Gallon | 137,400 |
| No. 2 Oil | Gallon | 139,600 |
| No. 3 Oil | Gallon | 141,800 |
| No. 4 Oil | Gallon | 145,100 |
| No. 5 Oil | Gallon | 148,800 |
| No. 6 Oil | Gallon | 152,400 |
| Nat. Gas | cu ft | 950 to 1,150 |
| Propane | cu ft | 2,550 |
| Butane | cu ft | 3,200 |

Training Materials

Training Materials

As a major manufacturer in the heating, ventilation and air conditioning industry, Honeywell strives to build high quality products. We are all well aware, however, that the consumer's comfort, safety and satisfaction depend on proper application, installation, service and use of our control devices. Since these vitally important functions depend on the skills of service technicians, we have made a long-term commitment to the technical training of all in the HVAC industry.

As part of our extensive involvement in training, we produce and publish the materials listed in this catalog. By making these materials available to instructors in schools and industry, we hope to share our investment and experience in training with others who have similar educational objectives.



Video is a very effective medium to use for both technical training and product familiarization. Many of the programs described here are relatively short and make a nice addition to a service meeting or formal class on HVAC controls. These tapes have been widely used in a number of applications such as:

- *At the distributor's counter* – to help answer questions and show technicians how to use new products

- *At service meetings* – to review new service procedures at the beginning of a season

- *In the classroom* – to provide students with authoritative information direct from the manufacturer

-

Burner and Boiler Controls

FSG Controls: The Gas Valve Train

Requirements for controlling gas flow to large burners and the hardware necessary to meet those requirements.

VT29

\$25.00

Note: this is a conversion of 35mm slides and sound track to videotape. 25:00

7800 SERIES

This series of videotapes includes the following:

VH147
(3-tape
package)

\$39.95

- **7800 SERIES: The Complete Line of Safety**

This product overview video highlights the features, benefits and accessories of the 7800 SERIES Burner Control. The video acquaints the viewer with a wide range of applications, including traditional boiler room, industrial and rooftop applications. The 7800 SERIES replaces more than 400 Honeywell and non-Honeywell controls, including programmers, primaries, and semi-automatic controls. Accessories highlighted include the Expanded Annunciator, which monitors additional safety limits and control points to minimize troubleshooting and downtime by identifying the source of the problem. 9:45, 1995

- **7800 SERIES: Easy, Basic Installation**

This video demonstrates how easy it is to install 7800 SERIES controls to upgrade equipment with state-of-the-art controls. In addition to covering basic installation procedures and tips, the video also reviews safety precautions and materials and tools needed for the job. 13:10, 1995

- **7800 SERIES: BCS Communications Packages**

Featuring the cost-saving benefits of using communications with Honeywell burner and boiler controls, this video highlights the QS7850 General Purpose Interface, which enables end-users to communicate through their current Honeywell and non-Honeywell industrial and building automation systems. Also demonstrated are features of Honeywell Combustion System Manager Software, a user-friendly Microsoft® Windows software package that supports networking for single-and multi-facility monitoring. 16:15, 1995

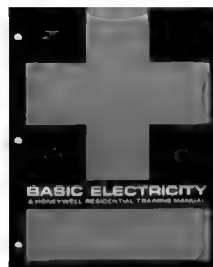


Burners and Boilers

Descriptions of various types of commercial and industrial gas, oil, and coal burners and their operation. Also boilers classified by construction and size. A comprehensive and understandable introduction to the subject. *65 pages*

70-8107

\$1.17

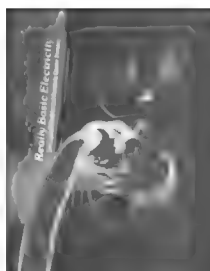


Basic Electricity

Introduces the student to basic electrical concepts. Only arithmetic and simple algebra are required for understanding. Topics include: direct current circuits, electromagnetism, alternating current circuits, measuring instruments, common wiring methods and others. *40 pages*

70-6714

\$4.00



Really Basic Electricity

Written for the person with no background in electricity. Introduces basic concepts of a.c. and d.c. electricity. Includes pictures and diagrams. *96 pages*

71-97004

\$7.00

Service Handbooks



RA890, R4795 and R7795 Service Handbook

Wiring and checkout, normal operation summary, flame current check, flame simulator, final checkout, service notes and test equipment. *59 pages*

70-8610

\$1.42



Troubleshooting Flame Safeguard Systems

Generalized troubleshooting information for the controls used on large burners and boilers. Information on recurring shut-downs, random shutdowns, measuring flame signal. Ten commandments for the burner service person, checking system operation and periodic maintenance. *11 pages*

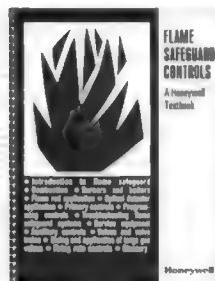
70-8626

\$0.58

FSG Textbook

FSG Textbook, "Flame Safeguard Controls: A Honeywell Textbook" 2nd edition

The most comprehensive and popular Flame Safeguard textbook available in our industry. It's where the beginners begin and where the "Old Pros" return year after year and problem after problem.



FSG Textbook, "Flame Safeguard Controls: A Honeywell Textbook", 362 pages

71-97558

\$22.50

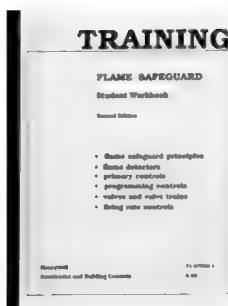
Contents:

- *Introduction to Flame Safeguard* – Flame Safeguard functions and controls.
- *Combustion* – explanation of fuel types and flame characteristics.
- *Burners and Boilers* – description of representative burners and boilers.
- *Flame Rod Application* – design and installation of flame rods and rectification systems.
- *Optical Detector Applications* – description, operation, application and checkout of detectors; covering rectifying photocells, infrared, and ultraviolet detectors.
- *Primary Controls* – capabilities and operation of primary controls (RA890, R4795 and R7795) used on smaller burners
- *Programming Controls* – capabilities and operation of programming controls (R4140 and BC7000 Microcomputer Programmable Controls).
- *Troubleshooting FSG Systems* – outlines systematic procedures for isolating common Flame Safeguard problems.
- *Service Equipment* – description and operation of testers, simulators and meters.
- *Auxiliary Equipment* – description, operation, application and checkout of pressure and temperature controllers.
- *Valves and Valve Trains* – description and application of typical Flame Safeguard valves and valve trains.
- *Sizing and Application of Large Gas Valves* – principles and procedures for selecting gas valves (includes selection nomographs).
- *Firing Rate Controls* – covers methods for controlling firing rate, firing rate sequences, programmer switching, motors and valves.
- *Glossary* – Flame Safeguard terminology.

Student Notebook – Review questions to use with the FSG Textbook, 50 pages

71-97555

\$5.00



These reference manuals are collations of Honeywell publications used to apply, install and service various categories of control products. Combined they represent virtually all of the technical information Honeywell publishes on its residential and light commercial electric and electronic controls.

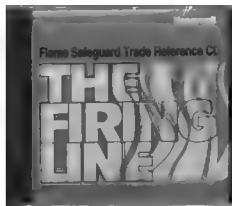


The Firing Line

A comprehensive manual designed to facilitate the upgrading and replacement of burner and boiler controls in commercial and industrial applications. Extensive information on approval bodies to explain what type of controls are required to meet various codes. Subjects include how to sell control modernization, how to sell replacement, conversion wiring, handy survey guides and worksheets.

70-8900

\$125.00



The Firing Line CD-ROM Version

The CD-ROM version of The Firing Line is a comprehensive reference media designed to facilitate the upgrade/replacement of burner and boiler controls in commercial and industrial applications. 1996

66-1081

\$25.00

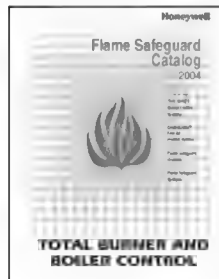


Flame Safeguard Reference Manual

Specification sheet collation on: primary controls, programming controls, gas valves, flame sensors, FSG motors, ignition transformers, pressure controls/limits, reset controls, multiple boiler controls, low water cutoff, and feed water valve.

66-1004

\$135.00



Flame Safeguard Catalog – Total Burner and Boiler Control

This catalog covers the complete line of Honeywell Burner and Boiler controls. In addition to our premier 7800 SERIES Burner Control Systems, BCS 7700 Boiler Control Systems and Communication Interface, the catalog covers flame amplifiers, firing rate motors, pressure/temperature sensors, amplifiers, auxiliary equipment, Flame Safeguard Modutrol IV motors, flame sensors, gas valves ignition transformers, modernization and replacement equipment, pressure controls/limits, primary and relay controls, programmers, test equipment, and commercial hydronic controls. Contains information on Flame Safeguard training materials, reference manuals and demonstrators and lab trainers.

70-8911

\$2.00



7800 Series Burner Control Manual

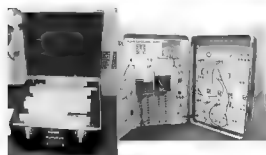
This manual contains promotional literature, features/functions/benefits, product selection submittal information, programmers, semi-automatic programmers, primaries, semiautomatic primaries, subbases, amplifiers, purge cards, optional components, expanded annunciator, communications, tester, accessories, conversion wiring diagrams, diagnostics, and troubleshooting, and cross references. In 3-ring poly binder.

66-1065

\$36.00

Lab Trainers

A lab trainer requires the student to actually perform point-to-point wiring to achieve a properly functioned control system.



DSP3452 Burner and Boiler Controls Demonstrator

DSP3452 \$2,300.00

The DSP3452 is designed to allow training and demonstration of all Honeywell Burner and Boiler Controls and auxiliary devices that are typically used with commercial and industrial burners. It demonstrates the operation of programmers and primaries, including 7800 SERIES controls, in gas applications. Permanently mounted controls include a spark generator (Q624), pilot burner, main burner, main valve, direct-coupled actuator and nine trouble switches. There is no auxiliary carrying case, which includes a supply of jumper wires with banana clips, boards with subbases mounted on them (Q270, Q795, Q520 and Q7800), brackets for flame detectors, and a propane bottle, regulator and hose. The trainer can be used with primary controls (RA890, RM7890, R4795, R7795 or RM7895) or programming controls (R4140, RM7840, BC7000 or RM7800). These controls are not included with the trainer.

The nine trouble switches simulate a range of faults from a burned out pilot valve to a faulty flame detector to an inoperative firing rate motor. The *fault key* is printed in the instructor's manual only.

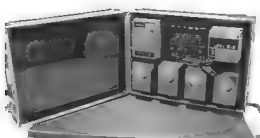
The trainer measures 20 in. by 30 in. by 10 in. It weighs approximately 30 lbs. (trainer and auxiliary case). Replaces DSP2002, DSP2010 and DSP2960. Includes an instructor's manual.



DSP3548 ControlLinks™ Configuration Kit

DSP3548 \$448.37

The Configuration Tool Kit was developed to assist with the commissioning of the ControlLinks™ Product line. It contains the Configuration Software, Software Manual, Converter modules and the required cables all in a handy carrying case with handle. ControlLinks™ products are restricted to Authorized ControlLinks™ Distributors.



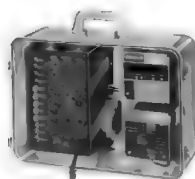
DSP3564 ControlLinks™ Demonstrator

DSP3564 \$1,575.00

The DSP3564 is designed for use in training on the Honeywell ControlLinks™ Fuel Air Control System.

The demonstrator contains the following items:

- One RM7800L1012
- One ST7800A1021
- One R7999A1005
- Four ML7999A1003
- One 1-5K Pot
- Six SPST Toggle Switches
- One R7847A1033
- One Q7800A1005
- One Q7999A1006
- Six Indicator Lights
- One 2-1K Pot
- One Carrying Case with handle (22" x 16" x 6")



DSP2672 Demonstrator

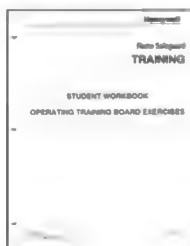
DSP2672 \$2,300.00

Demonstrator for use with 7800 SERIES Burner Controls. Includes RM7800L, R7849A, ST7800A, S7830A and (2) Q7800A plus control panel. Emulates a typical burner through the means of switches, relays, flame signal simulator and lamp loads.

Provides semi-automatic means to demonstrate the functionality of the Honeywell 7800 SERIES Burner Controls.

ACCESSORIES:

- Q7700 Communications Interface Base Unit.
- QS7800 Communications Interface ControlBus™ Module.
- ZM7850 Combustion System Manager™ Software.



Burner and Boiler Controls Demonstrator Student Workbook

This Manual contains the Operating Training Board Exercises for the student for the DSP3472

71-97116

\$2.00



Burner and Boiler Controls Demonstrator Instructors Manual

This Manual is the Instructor's version of the Operating Training Board Exercises for the DSP3472

71-97117

\$10.00

Ordering Information

Order online

You can order online at <http://customer.honeywell.com>

If you are already a Honeywell customer, login with your name and password and click on the Product Catalog link to find the materials you are looking for.

For a new customer follow these steps.

1. Go to <http://customer.honeywell.com>
2. Click on the REGISTER icon in the top right hand corner.
3. This will take you to a page where you will see the following link:
[Training Material Customer- User Registration](#)
4. Click on this link.

The window will change to a page where you will be asked to submit some information about yourselves. Click on the **SUBMIT** button after you are done inputting your information.

You will be e-mailed your password.

Use your e-mail address as the username and the password that was e-mailed as the password for logging-in.

Payment must be made by VISA, MasterCard or American Express card.

Shipping

All U.S. orders for training materials are shipped freight collect, UPS ground. Please pay with a credit card and the charges will be added to your total.

Expedited Orders

When requested, we will expedite an order and ship by air, but you must pay by credit card and you will be billed for the shipping costs.

International Orders

International orders *MUST* be placed through your local Honeywell subsidiary. They can advise you on ordering and shipping procedures. We cannot accept or ship international orders.

Returns

Returned items are accepted within four months of purchase. There are no cash refunds, and a \$30 restocking fee *per item* will be deducted from your credit. You are responsible for return shipping costs. The address for returns is printed on the bill of lading. Please call or fax in advance of your return and provide a list of the items that you are returning and a reason as to why you are returning them.

Form of Payment

Check or Money Order (Mailed orders only)

Enclose a check or money order with your order. Make check payable to Honeywell International Inc.

Credit Card

Charge your Training Materials Order to your VISA or MasterCard. Include card number, cardholder's name and expiration date on the Training Materials Order Form when you mail or fax in your order, or enter your credit card information on-line.

Inquiries

If it is necessary to contact us regarding your order, please specify the date the order was sent. Contact us at:

Honeywell International Inc.
MN10-1461
1985 Douglas Drive North
Golden Valley, MN 55422
FAX: 800-356-0149
PHONE: 763-954-5720

Note: Please allow 1 to 2 weeks to process and fill your order.

For International Ordering and Shipping Information
Contact Your Local Honeywell Subsidiary

Honeywell

AUTOMATION AND CONTROL PRODUCTS

WARRANTY POLICY

Honeywell warrants the products in this catalog (except those parts designated on Honeywell's price lists as not covered by this warranty) to be free from defects due to workmanship or materials, under normal use and service, for the following warranty periods. Honeywell Zoning products: twenty-four (24) months from date of installation. All Enviracaire Elite products excluding replacement maintenance parts: sixty (60) months from date of installation. F50 and F52 Air Cleaners and related parts: sixty (60) months from date of installation. F100 and F27 Air Cleaners: twenty-four (24) months from date of installation. Variable frequency drive devices and accessories: twenty-four (24) months on parts from date of installation when start-up and commissioning is performed by Honeywell VFD Authorized personnel. The warranty period for all other products is twelve (12) months from date of installation.

If a product is defective due to workmanship or materials, is removed within the applicable warranty period, and is returned to Honeywell in accordance with the procedure described below, Honeywell will, at its option, either repair, replace or credit the customer for the purchase price of the product, in accordance with the procedure described below. This warranty extends only to persons or organizations who purchase products in this catalog for resale.

The express warranty above constitutes the entire warranty of Honeywell with respect to the products in this catalog and IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL HONEYWELL BE RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER.

INSTRUCTIONS—INSTALLING OR SERVICING CONTRACTOR OR DEALER

When replacing a Honeywell product under warranty, including those products furnished on original heating and/or cooling equipment, you should rely on your local Honeywell Wholesaler or Distributor for prompt and efficient product replacement service.

A Honeywell Returned Goods Identification Tag (form 87-0030) or an electronic data notification system must be completed and approved by the servicing dealer/contractor prior to submitting the product to the Honeywell Wholesaler or Distributor. (Tags may be obtained from the Wholesaler or Distributor in advance.) No warranty claim for product replacement or credit will be honored by the Wholesaler/Distributor without a completed warranty tag attached or electronic notification.

INSTRUCTIONS—WHOLESALE OR DISTRIBUTOR

The following will apply to the return of any product to Honeywell under this warranty:

Any products which are:

- (i) identified with Honeywell's Returned Goods Identification Tag (form 87-0030), or electronic notification system;
- (ii) are listed individually with Returned Goods ID Tag numbers and date codes listed on Honeywell's Returned Goods Order (form 71-96024) or a similar form;

- (iii) packed separately from other returns and protected from shipping damage;
- (iv) have certification by the installer or servicing dealer that the product was removed, due to failure, within the applicable warranty period;
- (v) are received transportation pre-paid at:
Honeywell Return Goods
Dock 4 MN10-3860
1885 Douglas Drive
Golden Valley, MN 55422
- (vi) and are found by Honeywell's inspection to be defective in workmanship or materials under normal use and service

will be handled in accordance with one of the two following procedures, as specified by the customer making the return:

1. **CREDIT PROCEDURE.** Honeywell will issue credit, at Honeywell's lowest wholesaler net price in effect at the time of the return (as set forth on Honeywell's then current price sheet) or at the actual invoice amount if a copy of that invoice is attached to the packing list. (TRADELINE Replacement Exchange Products will be at Honeywell's lowest replacement exchange net price in effect at the time of such return, as shown on Honeywell's then current price sheet.) Honeywell reserves the right to disallow this credit option in cases of warranty abuse.

2. **REPAIR OR REPLACEMENT PROCEDURE.** Honeywell will, at its option, either repair or replace the product free of charge and return it or its replacement lowest cost transportation prepaid. The replacement will be a functionally equivalent new TRADELINE product. Premium transportation will be used at customer's request and expense.

The warranty will not be honored if:

- (i) product is damaged or missing parts or accessory items including batteries.
- (ii) product exhibits evidence of field misapplications.

Final disposition of any warranty claim will be determined solely by Honeywell. If inspection by Honeywell does not disclose any defect covered by the warranty, the product will be returned or scrapped as instructed by the customer and Honeywell's regular service charges will apply. Products returned to the customer may be sent shipping charges collect.

If you have any questions relative to product returns to Honeywell, contact your Customer Care Representative:

Honeywell
MN10-1461
1885 Douglas Drive
Golden Valley, MN 55422

SPECIAL MESSAGE TO INDUSTRIAL USERS AND BUILDING OWNERS

Thank you for using Honeywell products.

As a user, when you purchase a Honeywell product from this catalog you should expect performance from the product and, if it fails, replacement of the product by the installing dealer.

Typically, you will have purchased a Honeywell product under the following circumstances:

1. To modernize or refurbish your existing commercial and/or process control system.
2. You have purchased new commercial and/or process heating, cooling, air cleaning or humidification equipment

that is furnished with Honeywell controls or components (refer to your owner's manual furnished with the equipment).

3. A control has failed on your existing commercial and/or process heating and/or cooling equipment and is replaced by a Honeywell TRADELINE product.

With few exceptions, you utilize the services of a competent plumbing, heating and/or cooling dealer/contractor for new or replacement work performed.

Although our warranty does not extend to you, Honeywell does extend a warranty to your supplier.

Your supplier can rely on its local Honeywell Wholesaler/Distributor or Honeywell for prompt replacement.

If you have any questions, need additional information or would like to comment on Honeywell's products or services, please write or phone:

Honeywell
Customer Care MN10-1461
1885 Douglas Drive North
Golden Valley, MN 55422-4386
(612) 951-1000

or check your telephone directory (white pages) for one of many Honeywell field sales offices.

From Your Honeywell Wholesaler/Distributor

Honeywell

Automation and Control Solutions

Honeywell International
1985 Douglas Drive North
Golden Valley, MN 55422

70-8911 • Rev. 5-04



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post-consumer paper fibers.